DOCUMENT RESUME

ED 417 865 PS 026 445

AUTHOR Bellamy, Carol
TITLE The State of the World's Children 1998: Focus on Nutrition.
INSTITUTION United Nations Children's Fund, New York, NY.
ISBN ISBN-0-19-829401-8
ISSN ISSN-0265-718X
PUB DATE 1998-00-00
NOTE 135p.; For 1997 report, see ED 407 108; for 1997 summary report, see ED 407 109.
AVAILABLE FROM UNICEF, UNICEF House, 3 UN Plaza, New York, NY 10017; World Wide Web: http:// www.unicef.org; e-mail: pubdoc@unicef.org
PUB TYPE Reports - Descriptive (141)
EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Child Health; Childhood Needs; *Children; Developed Nations; Developing Nations; Foreign Countries; Hunger; *Nutrition; Poverty; Statistical Surveys; *Well Being
IDENTIFIERS Indicators; UNICEF; United Nations Convention on Rights of the Child; World Summit for Children 1990

ABSTRACT

This report on the well-being of the world's children focuses on the issue of malnutrition and its impact on children's lives. Chapter 1: (1) discusses the incidence of malnutrition and the complex interplay of factors that cause malnutrition, including poor health services and discrimination against women; (2) presents several approaches to ameliorating malnutrition, including community involvement, food fortification, growth monitoring and promotion, and supplementation programs; and (3) spotlights some of the scientific breakthroughs reducing malnutrition. Chapter 2 provides statistics related to basic indicators for nutrition, health, education, demographics, economic indicators and the situation of women, rates of progress, and regional summaries for 193 countries (listed alphabetically). It also lists countries in descending order of their estimated 1996 under-5 mortality rates. Included throughout the report are panel sections highlighting specific nutrition programs or scientific findings. Seven "Spotlights" feature information on the World Food Summit, breastfeeding, and several nutrients. (Contains approximately 68 references). (KB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 417 865

THE STATE OF THE WORLD'S CHILDREN 1998

PS 026445

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
N. van Oudenhoven
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

unicef
United Nations Children's Fund

Focus on Nutrition

BEST COPY AVAILABLE

THE STATE OF THE WORLD'S CHILDREN
1998

Oxford University Press, Walton Street,
Oxford, OX2 6DP, Oxfordshire, UK
Oxford, New York, Toronto, Delhi, Bombay,
Calcutta, Madras, Karachi, Kuala Lumpur,
Singapore, Hong Kong, Tokyo, Nairobi,
Dar es Salaam, Cape Town, Melbourne,
Auckland and associated companies in
Berlin and Ibadan

Oxford is a trade mark of Oxford
University Press
Published in the United States by
Oxford University Press, New York

Any part of THE STATE OF THE WORLD'S CHILDREN
may be freely reproduced with the appropriate
acknowledgement.

British Library Cataloguing in
Publication Data
The state of the world's children 1998
1. Children — Care and hygiene
613'0432 RJ101

ISBN 0-19-829401-8
ISSN 0265-718X

The Library of Congress has catalogued this
serial publication as follows:
The state of the world's children — Oxford and
New York: Oxford University Press
for UNICEF
v.; ill.; 20cm. Annual. Began publication
in 1980.
1. Children — Developing countries — Periodicals.
2. Children — Care and hygiene — Developing
countries — Periodicals. I. UNICEF.
HQ 792.2. S73 83-647550 362.7'1'091724

UNICEF, UNICEF House, 3 UN Plaza,
New York, NY 10017, USA

E-mail: pubdoc@unicef.org
Web site: www.unicef.org

UNICEF, Palais des Nations, CH-1211,
Geneva 10, Switzerland

Cover photo
India, 1996, 96-0163/Dominica

Back cover photo
Sudan, 1993, UNICEF/93-1007/Press

BEST COPY AVAILABLE

THE STATE OF THE WORLD'S CHILDREN 1998

Carol Bellamy, Executive Director,
United Nations Children's Fund

unicef
United Nations Children's Fund

Published for UNICEF by
Oxford University Press

5

Contents

Foreword by Kofi A. Annan, Secretary-General of the United Nations 6

Chapter I
Malnutrition: Causes, consequences and solutions 7

Malnutrition is rarely regarded as an emergency; the children affected are not facing famine and betray few or no obvious signs. Yet the largely invisible crisis of malnutrition is implicated in more than half of all child deaths worldwide and violates children's rights in profound ways, compromising their physical and mental development and helping perpetuate poverty. More widespread than many suspect — with one out of every three children affected — malnutrition lowers the productivity and abilities of entire societies. This chapter examines the scale of this intractable tragedy, the approaches that are helping resolve it and the new light that scientific research is shedding on it.

The silent emergency: In this section, the scale of malnutrition and the complex interplay of factors that cause it, including poor health services and discrimination against women, are presented. 9

Approaches that work: Community involvement, food fortification, growth monitoring and promotion, supplementation programmes — these are some of the many and often overlapping approaches that are changing, and saving, children's lives. 37

Bringing science to bear: Vitamin A reduced maternal death rates by 44 per cent on average, according to a recent study. This section spotlights some of the breakthroughs that science is making in the fight for better nutrition. 71

Chapter II
Statistical tables 91

Statistics, vital indicators of the care, nurture and resources that children receive in their communities and countries, help chart progress towards the goals set at the 1990 World Summit for Children. The eight tables in this report have been expanded to give the broadest possible coverage of important basic indicators for nutrition, health, education, demographics, economic indicators and the situation of women, plus rates of progress and regional summaries. They also include complete data, as available, on less populous countries, covering 193 countries in all, listed alphabetically. Countries are shown on page 93 in descending order of their estimated 1996 under-five mortality rates, which is also the first basic indicator in table 1.

Panels

1 Vitamin A supplements save pregnant women's lives 12
2 What is malnutrition? 14
3 Stunting linked to impaired intellectual development 16
4 Recognizing the right to nutrition 20
5 Growth and sanitation: What can we learn from chickens? 26
6 Breastmilk and transmission of HIV 30
7 High-energy biscuits for mothers boost infant survival by 50 per cent 32
8 UNICEF and the World Food Programme 38
9 Triple A takes hold in Oman 40
10 Celebrating gains in children's health in Brazil 42
11 Rewriting Elias's story in Mbeya 44

6

12 Women in Niger take the lead against malnutrition 46
13 BFHI: Breastfeeding breakthroughs 50
14 Tackling malnutrition in Bangladesh 52
15 Kiwanis mobilize to end iodine deficiency's deadly toll 56
16 Indonesia makes strides against vitamin A deficiency 62
17 Making food enrichment programmes sustainable 64
18 Zinc and vitamin A: Taking the sting out of malaria 74
19 Protecting nutrition in crises 80
20 Progress against worms for pennies 84
21 Child nutrition a priority for the new South Africa 86

Spotlights

World Food Summit 39
Ten steps to successful breastfeeding 49
Vitamin A 76
Zinc 77
Iron 78
Iodine 79
Folate 83

Text figures

Fig. 1 Malnutrition and child mortality 11
Fig. 2 Trends in child malnutrition, by region 18
Fig. 3 From good nutrition to greater productivity and beyond 19
Fig. 4 Poverty and malnutrition in Latin America and the Caribbean 21
Fig. 5 Causes of child malnutrition 24
Fig. 6 Inadequate dietary intake/disease cycle 25
Fig. 7 Intergenerational cycle of growth failure 34
Fig. 8 Better nutrition through triple A 41
Fig. 9 Iodine deficiency disorders and salt iodization 55
Fig. 10 Progress in vitamin A supplementation programmes 59
Fig. 11 Measles deaths and vitamin A supplementation 72
Fig. 12 Zinc supplementation and child growth (Ecuador, 1986) 73
Fig. 13 Maternal height and Caesarean delivery (Guatemala, 1984-1986) 75

References 88
Index 128
Glossary 131

BEST COPY AVAILABLE

Foreword

To look into some aspects of the future, we do not need projections by supercomputers. Much of the next millennium can be seen in how we care for our children today. Tomorrow's world may be influenced by science and technology; but more than anything, it is already taking shape in the bodies and minds of our children.

In *The State of the World's Children 1998*, UNICEF — the only United Nations agency dedicated exclusively to children — spells out a simple but most pressing truth. Sound nutrition can change children's lives, improve their physical and mental development, protect their health and lay a firm foundation for future productivity.

Over 200 million children in developing countries under the age of five are malnourished. For them, and for the world at large, this message is especially urgent. Malnutrition contributes to more than half of the nearly 12 million under-five deaths in developing countries each year. Malnourished children often suffer the loss of precious mental capacities. They fall ill more often. If they survive, they may grow up with lasting mental or physical disabilities.

This human suffering and waste happen because of illness — much of it preventable; because breastfeeding is stopped too early; because children's nutritional needs are not sufficiently understood; because long-entrenched prejudices imprison women and children in poverty.

The world knows what is needed to end malnutrition. With a strong foundation of cooperation between local communities, non-governmental organizations, governments and international agencies, the future — and the lives of our children — can take the shape we want and they deserve, of healthy growth and development, greater productivity, social equity and peace.

Kofi A. Annan
Secretary-General of the United Nations

Chapter I

Malnutrition: Causes, consequences and solutions

UNICEF/1982/Murray Lee

A healthy baby girl waits in a maternal and child health centre in Benin

BEST COPY AVAILABLE

The silent emergency

It is implicated in more than half of all child deaths worldwide — a proportion unmatched by any infectious disease since the Black Death. Yet it is not an infectious disease.

Its ravages extend to the millions of survivors who are left crippled, chronically vulnerable to illness — and intellectually disabled.

It imperils women, families and, ultimately, the viability of whole societies. It undermines the struggle of the United Nations for peace, equity and justice. It is an egregious violation of child rights that undermines virtually every aspect of UNICEF's work for the survival, protection and full development of the world's children.

Yet the worldwide crisis of malnutrition has stirred little public alarm, despite substantial and growing scientific evidence of the danger. More attention is lavished on the gyrations of world stock markets than on malnutrition's vast destructive potential — or on the equally powerful benefits of sound nutrition, including mounting evidence that improved nutrition, such as an adequate intake of vitamin A and iodine, can bring profound benefits to entire populations.

Malnutrition is a silent emergency. But the crisis is real, and its persistence has profound and frightening implications for children, society and the future of humankind.

Malnutrition is not, as many think, a simple matter of whether a child can satisfy her appetite. A child who eats enough to satisfy immediate hunger can still be malnourished.

And malnutrition is not just a silent emergency — it is largely an invisible one as well. Three quarters of the children who die worldwide of causes related to malnutrition are what nutritionists describe as mildly to moderately malnourished and betray no outward signs of problems to a casual observer.

Malnutrition's global toll is also not mainly a consequence of famines, wars and other catastrophes, as is widely thought; in fact, such events are responsible for only a tiny part of the worldwide malnutrition crisis. But such emergencies, like the ongoing crises in the Great Lakes region of Central Africa and in the Democratic People's Republic of Korea, often result in the severest forms of malnutrition. Meeting food needs in these situations is essential, but so is protecting people from illness and ensuring that young children and other vulnerable groups receive good care.

Child malnutrition is not confined to the developing world. In some industrialized countries, widening income disparities, coupled with reduc-

More attention is lavished on the gyrations of world stock markets than on malnutrition's vast destructive potential — or on the equally powerful benefits of sound nutrition.

Photo: Improved nutrition brings profound benefits. A Bolivian girl holds a piece of bread

UNICEF/93-0/Isaac

Reducing malnutrition should be an urgent global priority; inaction is a scandalous affront to the human right to survival. A malnourished child with his mother in Afghanistan.

tions in social protection, are having worrying effects on the nutritional well-being of children.

Whatever the misconceptions, the dimensions of the malnutrition crisis are clear. It is a crisis, first and foremost, about death and disability of children on a vast scale, about women who become maternal mortality statistics partly because of nutritional deficiencies and about social and economic costs that strangle development and snuff out hope.

Malnutrition has long been recognized as a consequence of poverty. It is increasingly clear that it is also a cause.

In some parts of the world, notably Latin America and East Asia, there have been dramatic gains in reducing child malnutrition. But overall, the absolute number of malnourished children worldwide has grown.

Half of South Asia's children are malnourished. In Africa, one of every three children is underweight, and in several countries of the continent, the nutritional status of children is worsening.

Malnourished children are much more likely to die as a result of a common childhood disease than those who are adequately nourished. And research indicates a link between malnutrition in early life — including the period of foetal growth — and the development later in life of chronic conditions like coronary heart disease, diabetes and high blood pressure, giving the countries in which malnutrition is already a major problem new cause for concern.

The most critically vulnerable groups are developing foetuses, children up to the age of three and women before and during pregnancy and while they are breastfeeding. Among children, malnutrition is especially prone to strike those who lack nutritionally adequate diets, are not protected from frequent illness and do not receive adequate care.

Illness is frequently a consequence of malnutrition — and malnutrition is also commonly the result of illness. Malaria, a major cause of child deaths in large parts of the world, also takes a major toll on child growth and development. In parts of Africa where malaria is common, about one third of child malnutrition is caused by malaria. The disease also has dangerous nutritional consequences for pregnant women. In addition, pregnant women are more susceptible to malaria, and children born to mothers with malaria run a greater chance of being born underweight and anaemic.

There is no one kind of malnutrition. It can take a variety of forms that often appear in combination and contribute to each other, such as protein-energy malnutrition, iodine deficiency disorders and deficiencies of iron and vitamin A, to name just a few.

Many involve deficiencies of 'micronutrients' — substances like vitamin A and iodine that the human body cannot make itself but that are needed, often in only tiny amounts, to orchestrate a whole range of essential physiological functions.

Each type of malnutrition is the result of a complex interplay of factors involving such diverse elements as household access to food, child and maternal care, safe water and sanitation and access to basic health services.

And each wreaks its own particular kind of havoc on the human body.

Iodine deficiency can damage intellectual capacity; anaemia is a factor in the pregnancy and childbirth complications that kill 585,000 women annually; folate deficiency in expectant mothers can cause birth defects in infants, such as spina bifida; and vitamin D deficiency can lead to poor bone formation, including rickets.

Vitamin A deficiency, which affects about 100 million young children worldwide, was long known to

than double the rate of most other industrialized countries.[13]

In the United Kingdom, children and adults in poor families face health risks linked to diet, according to a recent study that cited high rates of anaemia in children and adults, and of premature and low-weight births, dental diseases, diabetes, obesity and hypertension.[14]

In Central and Eastern Europe, economic dislocations accompanying the transition to market economies and major cutbacks in state-run social programmes are having a more profound effect on the most vulnerable.

In the Russian Federation, the prevalence of stunting among children under two years of age increased from 9 per cent in 1992 to 15 per cent in 1994.[15] And in the Central Asian republics and Kazakstan, 60 per cent of pregnant women and young children are now anaemic.

The effects of malnutrition also cross generations. The infants of women who are themselves malnourished and underweight are likely to be small at birth.

Overall, 60 per cent of women of childbearing age in South Asia — where half of all children are underweight — are themselves underweight. In South-East Asia, the proportion of underweight women is 45 per cent; it is 20 per cent in sub-Saharan Africa.

The power of good nutrition

The devastation of malnutrition is hard to overstate, but so is the countervailing power of nutrition. Not only is good nutrition the key to the healthy development of individuals, families and societies, but there is also growing reason to believe that improving the nutrition of women and children will contribute to overcoming some of the greatest health challenges facing the world, including the burden of chronic and degenerative disease, maternal mortality, malaria and AIDS.

The most obvious proof of the power of good nutrition can be seen in the taller, stronger, healthier children of many countries, separated by only a generation from their shorter, less robust parents, and by the better diets and more healthful, nurturing environments they enjoy.

Stronger children grow into stronger, more productive adults. Well-nourished girls grow into women who face fewer risks during pregnancy and childbearing, and whose children set out on firmer developmental paths, physically and mentally. And history shows that societies that meet women's and children's nutritional needs also lift their capacities for greater social and economic progress (Fig. 3).

Approximately half of the economic growth achieved by the United Kingdom and a number of Western European countries between 1790 and 1980, for example, has been attributed to better nutrition and improved health and sanitation conditions, social investments made as much as a century earlier.[16]

Even in countries or regions where poverty is entrenched, the health and development of children and women can be greatly protected or improved (Fig 4). In parts of Brazil, for example, the percentage of underweight children plummeted from 17 per cent in 1973 to just under 6 per cent in 1996, at a time when poverty rates almost doubled.

Much has already been achieved. For example, 12 million children every year are being spared irreversible mental impairment from iodine deficiency because of iodized salt. And more than 60 per cent of young children around the world are receiving vitamin A supplements.

Some effects of even severe malnutrition on a child's mental development

Approximately half of the economic growth achieved by the United Kingdom and a number of Western European countries between 1790 and 1980, for example, has been attributed to better nutrition and improved health and sanitation conditions, social investments made as much as a century earlier.

Panel 1

Vitamin A supplements save pregnant women's lives

Gilles Vauclair

Each year, nearly 600,000 women die worldwide from pregnancy-related causes. Prenatal vitamin A supplements will help reduce this massive toll, according to preliminary results from a major new study. By measuring the impact of low weekly doses of the vitamin on the health and survival of pregnant women in southern Nepal, the study found that deaths among women receiving either low-dose vitamin A or beta-carotene supplements dropped dramatically, by an average 44 per cent.

Like many parts of the developing world, Nepal has a notoriously high maternal mortality rate — 125 times that of the United States -- and vitamin A deficiency is common, particularly among pregnant women. Night-blindness, long ignored by the medical establishment and viewed by women as a routine consequence of pregnancy, but in reality a worrying sign of vitamin A deficiency, develops in 10 to 20 per cent of pregnant women.

Researchers from Johns Hopkins University in the United States and the National Society for Eye Health and Blindness Prevention in Nepal, supported by the United States Agency for International Development (USAID) and Task Force Sight and Life, based in Switzerland, conducted the study to see whether maternal, foetal or infant mortality could be lowered by providing women of childbearing age one low-dose vitamin A capsule each week. Night-blindness and anaemia in women in the study and birth defects in their infants were also carefully investigated.

Approximately 44,000 young married women, nearly half of whom became pregnant during the study, were given either vitamin A supplements[a] or placebos. The supplements were in the form of either pure vitamin A or beta-carotene, the vitamin A-active ingredient found in fruits and vegetables that the body converts to vitamin A.

Among the women receiving pure vitamin A there were 38 per cent fewer deaths and among those receiving beta-carotene there were 50 per cent fewer deaths, during pregnancy and the three months following childbirth, than among women receiving no supplements.[b] Anaemia, which is usually associated with iron deficiency and which is known to be a contributing cause of maternal deaths, was a surprising 45 per cent lower in the women receiving supplements who were not infected with hookworm.

Women suffering from night-blindness (an inability to see at dusk or in dim light) were found to be more likely to get infections, to be anaemic and underweight and to be at greater risk of death. Night-blindness was reduced by 38 per cent and 16 per cent, respectively, in the vitamin A and beta-carotene groups, leaving questions about the most appropriate mix of nutrients, and the amounts needed, to prevent the condition. No reduction in foetal or infant mortality through six months of age was apparent in children born to women in the study.

The scientists have not yet completed analysing the effects of supplements on the different causes of maternal deaths. However, deaths from infection are one important cause of high maternal mortality rates, and vitamin A is known to be essential for the effective functioning of the immune system that reduces the severity of infection.

The results of this study indicate that where vitamin A deficiency is common, the regular and adequate

intake of vitamin A[c] or beta-carotene by women during their reproductive years can markedly reduce their risk of pregnancy-related mortality. Adequate intake of vitamin A may also dramatically reduce anaemia in pregnant women if combined with deworming.

This study helps highlight the urgent need to improve the nutrition of girls and women as part of a multi-pronged approach to reduce the tragedy of maternal mortality in the developing world and opens the way to new prevention strategies that can be widely implemented in the near future.

NOTES

a. The low-dose supplements contained 7,000 µg of retinol equivalents (RE) (23,300 IU) of vitamin A, or a similar amount of beta-carotene, which is approximately equivalent to a woman's weekly requirement.

b. Deaths were reduced from 713 per 100,000 pregnancies in the group of women not receiving supplements to 443 and 354 deaths per 100,000 respectively in women receiving the weekly vitamin A and beta-carotene supplements.

c. Although found in many foods, vitamin A has powerful biological effects and care is essential to prevent the misuse of supplements, especially by pregnant women. *High-dose (200,000 IU)* vitamin A supplements of the type routinely provided at four to six monthly intervals to young children in developing countries should **never** be taken by women of childbearing age because of the risk of possible harm to a developing foetus. *High-dose* supplements may, however, be safely given to women within eight weeks following childbirth. *Low-dose* weekly vitamin A supplements, like those given in this study, and even lower-dose daily supplements can be taken by women during their reproductive years with little risk to mother or foetus and with considerable benefit wherever deficiency is likely.

Photo: A mother and child in Nepal, where a recent study showed that weekly vitamin A supplements given to pregnant women substantially reduced maternal deaths.

healthy children. And children who were not breastfed have IQs that are 8 points lower than breastfed children.

The depletion of human intelligence on such a scale — for reasons that are almost entirely preventable — is a profligate, even criminal, waste.

Robbed of their mental as well as physical potential, malnourished children who live past childhood face diminished futures. They will become adults with lower physical and intellectual abilities, lower levels of productivity and higher levels of chronic illness and disability, often in societies with little economic capacity for even minimal therapeutic and rehabilitative measures.

At the family level, the increased costs and pressures that malnutrition-linked disability and illness place on those who care for them can be devastating to poor families — especially to mothers, who receive little or no help from strained social services in developing countries.

And when the losses that occur in the microcosm of the family are repeated millions of times at the societal level, the drain on global development is staggering.

In 1990 alone, the worldwide loss of social productivity caused by four overlapping types of malnutrition — nutritional stunting and wasting, iodine deficiency disorders and deficiencies of iron and vitamin A — amounted to almost 46 million years of productive, disability-free life, according to one reckoning.[3]

Vitamin and mineral deficiencies are estimated to cost some countries the equivalent of more than 5 per cent of their gross national product in lost lives, disability and productivity. By this calculation, Bangladesh and India forfeited a total of $18 billion in 1995.[4]

Malnourished children's low resistance to illness diminishes the effectiveness of the considerable resources

Vitamin and mineral deficiencies are estimated to cost some countries the equivalent of more than 5 per cent of their gross national product in lost lives, disability and productivity.

Panel 2

What is malnutrition?

UNICEF/94-0736/Toutounji

Malnutrition is usually the result of a combination of inadequate dietary intake and infection (Fig. 6). In children, malnutrition is synonymous with growth failure — malnourished children are shorter and lighter than they should be for their age. To get a measure of malnutrition in a population, young children can be weighed and measured and the results compared to those of a 'reference population' known to have grown well. Measuring weight and height is the most common way of assessing malnutrition in populations.

Although many people still refer to growth failure as 'protein-energy malnutrition,' or PEM, it is now recognized that poor growth in children results not only from a deficiency of protein and energy but also from an inadequate intake of vital minerals (such as iron, zinc and iodine) and vitamins (such as vitamin A), and often essential fatty acids as well. These minerals are needed in tiny quantities, on the order of a few thousandths of a gram or less each day. They are consequently called micronutrients. Micronutrients are needed for the production of enzymes, hormones and other substances that are required to regulate biological processes leading to growth, activity, development and the functioning of the immune and reproductive systems.

All of the minerals that the body needs — calcium, phosphorous, iron, zinc, iodine, sodium, potassium and magnesium, for example — have to come either from the food we eat or from supplements. While the body manufactures many of the complex organic molecules it needs from simpler building blocks, the vitamins — A, the B complex, C and so on — are not synthesized. Vitamin D is exceptional in that it can be made in the skin, providing a person has sufficient exposure to direct sunlight.

While micronutrients are needed at all ages, the effects of inadequate intake are particularly serious during periods of rapid growth, pregnancy, early childhood and lactation. We are learning more every day about the importance of micronutrients for the physical and the cognitive development of children.

While widespread moderate malnutrition may not be obvious unless children are weighed and measured, some severely malnourished children develop clinical signs that are easily observed — severe wasting (or marasmus) and the syndrome known as kwashiorkor, with skin and hair changes and swelling of arms and legs. Despite years of research, the reasons why some children develop kwashiorkor and why others develop marasmus remains a mystery. What is clear is that left untreated, children with either condition are at high risk of dying from severe malnutrition, and that both kwashiorkor and marasmus can be prevented by ensuring an adequate intake of nutritious food and freedom from repeated infections. Less severe forms of malnutrition also cause death, mostly because they weaken children's resistance to illness (Fig. 1).

The 1990 World Summit for Children singled out deficiencies of three micronutrients — iron, iodine, and vitamin A — as being particularly common and of special concern for children and women in developing countries. Recently, knowledge of the prevalence and importance of zinc for child growth and development has placed it in that league as well. Vitamin D deficiency is now recognized as a major problem of children in countries such as Mongolia, the northern parts of China and some of the countries of the Commonwealth of Independent States that have long winters.

Throughout this report, the term malnutrition is used to refer to the consequences of the combination of an inadequate intake of protein energy, micronutrients and frequent infections.

Photo: Three sisters at a health centre in Haiti

that are spent to ensure that families have access to basic health services and sanitation. And investments in basic education by governments and their partners are compromised by malnutrition's pernicious effects on brain development and intellectual performance.

Iodine deficiency and iron deficiency anemia, which threaten millions of children, are especially worrisome factors as countries strive to improve their educational systems.

Iron-deficient children under the age of two years show problems with coordination and balance and appear more withdrawn and hesitant. Such factors can hinder a child's ability to interact with and learn from the environment and may lead to lower intellectual abilities.[5]

Severe iodine deficiency in utero can cause the profound mental retardation of cretinism. But milder deficiencies also take an intellectual toll. In the republic of Georgia, for instance, a widespread iodine deficiency, recently detected, is estimated to have robbed the country of 500,000 IQ points in the 50,000 babies born in 1996 alone.[6]

Many children suffer from multiple types of malnutrition, so numbers tend to overlap. But it is reliably estimated that globally 226 million children are stunted — shorter than they should be for their age, and shorter than could be accounted for by any genetic variation (Panel 2). Stunting is particularly dangerous for women, as stunted women are more likely to experience obstructed labour and are thus at greater risk of dying while giving birth. Stunting is associated with a long-term reduction in dietary intake, most often closely related to repeated episodes of illness and poor-quality diets.

A study in Guatemala found that severely stunted men had an average of 1.8 fewer years of schooling than those who were non-stunted, while severely stunted women had, on average, one year less. The differences are important since every additional year of schooling translated into 6 per cent more in wages[7] (Panel 3).

Some 67 million children are estimated to be wasted, which means they are below the weight they should be for their height — the result of reduced dietary intake, illness, or both.

About 183 million children weigh less than they should for their age. In one study, children who were severely underweight[8] were found to be two to eight times more likely to die within the following year as children of normal weight for their age.[9]

More than 2 billion people — principally women and children — are iron deficient,[10] and the World Health Organization (WHO) has estimated that 51 per cent of children under the age of four in developing countries are anaemic.[11]

In most regions of the developing world, malnutrition rates have been falling over the last two decades, but at markedly different paces (Fig. 2). The exception is sub-Saharan Africa, where malnutrition rates began increasing in most countries during the early 1990s, following the regional economic decline that began in the late 1980s. As government budgets shrank, basic social services and health services were hit particularly hard. Per capita incomes also declined, affecting people's ability to purchase food.

In the United States, researchers estimate that over 13 million children — more than one in every four under the age of 12 — have a difficult time getting all the food they need, a problem that is often at its worst during the last week of the month when families' social benefits or wages run out.[12] Over 20 per cent of children in the United States live in poverty, more

Iron-deficient children under the age of two years show problems with coordination and balance and appear more withdrawn and hesitant. Such factors can hinder a child's ability to interact with and learn from the environment and may lead to lower intellectual abilities.

Panel 3

Stunting linked to impaired intellectual development

Malnutrition early in life is linked to deficits in children's intellectual development that persist in spite of schooling and impair their learning ability, according to a recent study in the Philippines. The study analysed stunting — which is low height for age and a basic indicator of malnutrition — among more than 2,000 children living in metropolitan Cebu, the Philippines' second largest city. Nearly two thirds of the children studied were stunted. Those stunted earliest in life, before six months of age, were the most severely stunted by age two, the study found. The same children scored significantly lower on intelligence tests at 8 and 11 years of age than children who were not stunted.

The study holds profound implications on a global level: 226 million children under age five in developing countries, nearly 40 per cent of this age group, suffer from moderate or severe stunting. "High levels of stunting among children suggest that there will also be long-term deficits in mental and physical development that can leave children ill-prepared to take maximum advantage of learning opportunities in school. This can also have consequences for children's success later in life," says Linda S. Adair, Ph.D., Associate Professor of Nutrition at the University of North Carolina, in Chapel Hill (US), one of the researchers.

"Stunting does not directly cause poor intellectual development in children," emphasizes Professor Adair. "Rather, the same underlying factors that cause stunting are also likely to impair children's intellectual growth." Among children in Cebu, the causes include low birthweight, insufficient breastfeeding, nutritionally inadequate food given to complement or replace breastmilk, and frequent diarrhoea and respiratory infections. Stunted children tend to enter school later and miss more days of school than well-nourished children, the study also found.

The study, part of a collaborative research programme of the Office of Population Studies at the University of San Carlos in Cebu and the University of North Carolina, found that 28 per cent of the children surveyed were severely stunted. At age two, these children were nearly 11 centimeters (5 inches) shorter than children who were not stunted. The IQ scores of the severely stunted children at eight years of age were 11 points lower than those of the children who were not stunted.

When the children in the study were tested again at age 11, those who had been most severely stunted at age 2 still scored lower on the intelligence test than children who had not been stunted, although the gap was narrower at about 5 IQ points. Children who were severely stunted also had significantly lower scores on language and math achievement tests.

Most of the children in the study were from poor families, and their diets, and those of their mothers, were below the nutritional levels recommended by the Philippine Government. They came from densely populated, poor urban communities, from newly settled areas on the outskirts of the city and from rural communities.

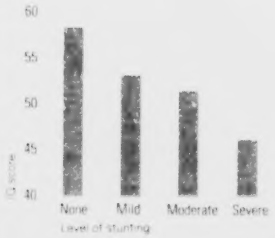
This study underscores the importance and lasting impact of nutrition in the crucial months of infancy and beginning before birth with sound maternal nutrition. Infants denied a strong start in life face problems in making up the lost ground, and the impact on their own development and that of their societies can be a lasting one.

UNICEF/97-0518/Vauclair

Nearly 40 per cent of all children under five in the world are stunted due to malnutrition. Many of them will also face challenges in school as a result. Here, a contrast in stature is apparent between two girls the same age in Bangladesh.

The effects of stunting

In a non-verbal intelligence test given to eight year-olds in the Philippines, scores strongly correlated with children's level of stunting at age two. Children severely stunted at age two had the lowest test scores, while non-stunted children had scores on average 11 points higher.



BEST COPY AVAILABLE

than double the rate of most other industrialized countries.[13]

In the United Kingdom, children and adults in poor families face health risks linked to diet, according to a recent study that cited high rates of anaemia in children and adults, and of premature and low-weight births, dental diseases, diabetes, obesity and hypertension.[14]

In Central and Eastern Europe, economic dislocations accompanying the transition to market economies and major cutbacks in state-run social programmes are having a more profound effect on the most vulnerable.

In the Russian Federation, the prevalence of stunting among children under two years of age increased from 9 per cent in 1992 to 15 per cent in 1994.[15] And in the Central Asian republics and Kazakstan, 60 per cent of pregnant women and young children are now anaemic.

The effects of malnutrition also cross generations. The infants of women who are themselves malnourished and underweight are likely to be small at birth.

Overall, 60 per cent of women of childbearing age in South Asia — where half of all children are underweight — are themselves underweight. In South-East Asia, the proportion of underweight women is 45 per cent; it is 20 per cent in sub-Saharan Africa.

The power of good nutrition

The devastation of malnutrition is hard to overstate, but so is the countervailing power of nutrition. Not only is good nutrition the key to the healthy development of individuals, families and societies, but there is also growing reason to believe that improving the nutrition of women and children will contribute to overcoming some of the greatest health challenges facing the world, including the burden of chronic and degenerative disease, maternal mortality, malaria and AIDS.

The most obvious proof of the power of good nutrition can be seen in the taller, stronger, healthier children of many countries, separated by only a generation from their shorter, less robust parents, and by the better diets and more healthful, nurturing environments they enjoy.

Stronger children grow into stronger, more productive adults. Well-nourished girls grow into women who face fewer risks during pregnancy and childbearing, and whose children set out on firmer developmental paths, physically and mentally. And history shows that societies that meet women's and children's nutritional needs also lift their capacities for greater social and economic progress (Fig. 3).

Approximately half of the economic growth achieved by the United Kingdom and a number of Western European countries between 1790 and 1980, for example, has been attributed to better nutrition and improved health and sanitation conditions, social investments made as much as a century earlier.[16]

Even in countries or regions where poverty is entrenched, the health and development of children and women can be greatly protected or improved (Fig 4). In parts of Brazil, for example, the percentage of underweight children plummeted from 17 per cent in 1973 to just under 6 per cent in 1996, at a time when poverty rates almost doubled.

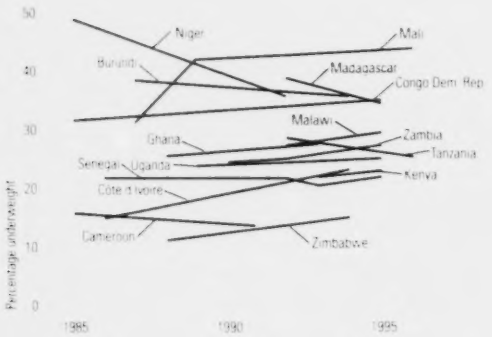
Much has already been achieved. For example, 12 million children every year are being spared irreversible mental impairment from iodine deficiency because of iodized salt. And more than 60 per cent of young children around the world are receiving vitamin A supplements.

Some effects of even severe malnutrition on a child's mental development

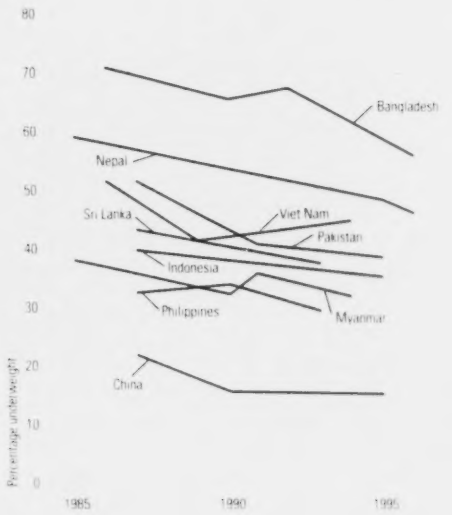
Approximately half of the economic growth achieved by the United Kingdom and a number of Western European countries between 1790 and 1980, for example, has been attributed to better nutrition and improved health and sanitation conditions, social investments made as much as a century earlier.

Fig. 2 Trends in child malnutrition, by region

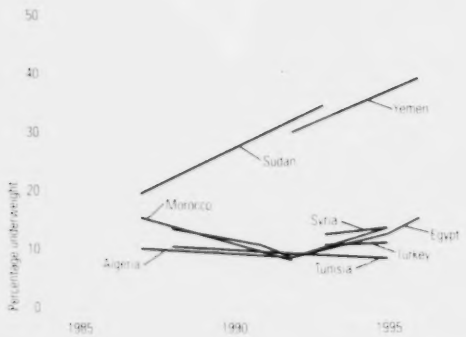
The chart shows trends in malnutrition in 41 countries, in four regions, covering over half of children under five years old in the developing world. Countries with under-five populations below 1 million are not included, even where trend data were available.



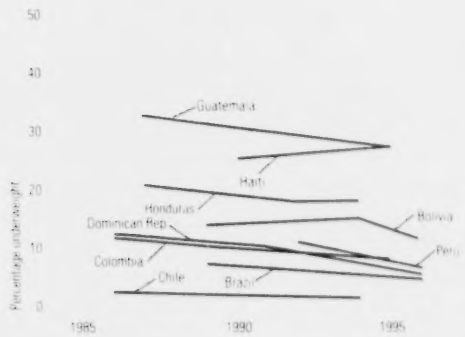
Sub-Saharan Africa



Asia and Pacific



Middle East and North Africa



Latin America and the Caribbean

Note: Malnutrition is measured as the percentage of under-five children below -2 standard deviations of the median value for the National Center for Health Statistics (NCHS) reference population for weight-for-age. Rates have been adjusted for age; data for some countries reflect rates for the under-three population.

Source: UNICEF, 1997

BEST COPY AVAILABLE

can be at least partially reversed. The intelligence of severely malnourished children was found to improve markedly, for example, when health care, adequate food and stimulation were provided continually.[17]

And there is increasing evidence that good nutrition helps the body resist infection; that when infection occurs, nutrition relieves its severity and seriousness; and that it speeds recovery.

Thirty years ago, most people could readily accept the notion that a 'good diet' was beneficial to overall health. But the idea that specific nutrients could help fend off — or, even more outlandishly, help treat — specific diseases smacked of 'fringe science'.

Today, through clinical trials and studies, the fringe is edging closer to the mainstream, as nutrition scientists as well as immunologists, paediatricians and gerontologists test the implications for public policy of large-scale interventions to improve nutrition and its effects on an array of critical physiological processes.

Malnutrition, reflected in the poor growth of children and adolescents and the high prevalence of low-birthweight babies, already has well-known effects on a child's capacity to resist illness. It is thus reasonable to argue that in the global fight to reduce childhood death and illness, initiatives to improve nutrition may be as powerful and important as, for example, immunization programmes.

There are now numerous scientific studies that suggest, but do not yet prove, that vitamin A deficiency in a mother infected with the human immunodeficiency virus (HIV) may increase her risk of transmitting the virus to her infant.

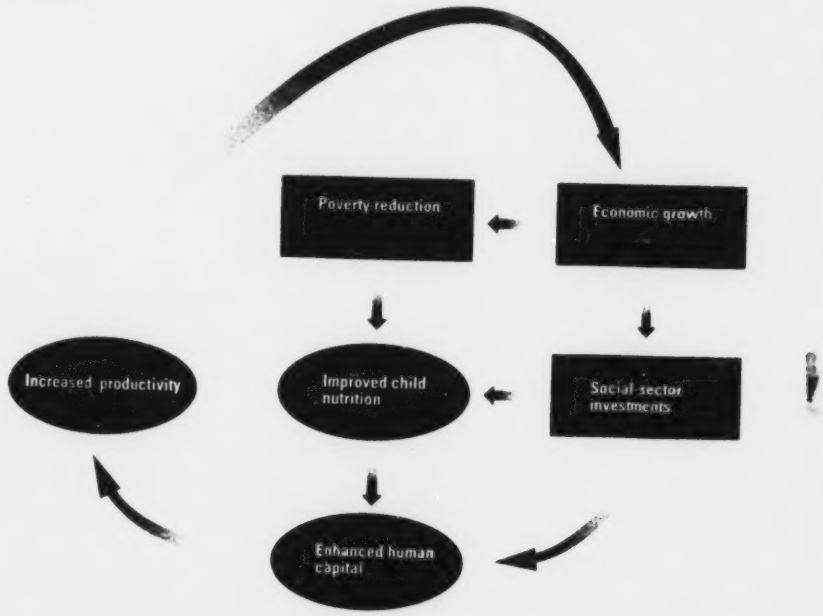
Early in the next millennium, it is thought that between 4 million and 5 million children will be infected with HIV. The majority, mostly in sub-Saharan Africa, will acquire the infection directly from their mothers. Although it will take another year or two to be absolutely sure, improving the vitamin A status of populations where both HIV infection and vitamin A deficiency are common may make some contribution to reducing the transmission of the virus.

The right to good nutrition

However far-reaching the benefits of nutrition may be, ensuring good nutrition is a matter of international law, articulated in variously specific language in international declarations and human rights instruments dating back to the adoption of the Declara-

Fig. 3 From good nutrition to greater productivity and beyond

Good early nutrition is most likely to result where there is economic growth, especially equitable growth; when social services become affordable and accessible, and when adequate investment is made in human resources, including the empowerment of women. Good nutrition, in turn, contributes to greater productivity and thus to economic growth.



Source: Adapted from Stuart Gillespie, John Mason and Reynaldo Martorell, How Nutrition Improves, ACC/SCN, Geneva, 1996

Panel 4

Recognizing the right to nutrition

Nutrition has been expressed as a right in international human rights instruments since 1924. Among these are *declarations*, which are non-binding, and *conventions* and *covenants*, which are treaties carrying the force of law.

Some of these human rights milestones are noted below.

1924: Declaration of the Rights of the Child (also known as the Declaration of Geneva). Adopted after World War I by the League of Nations through the efforts of British child rights pioneer Eglantyne Jebb, the Declaration marks the beginning of the international child rights movement and is also the first international affirmation of the right to nutrition. The Declaration affirms that "the child must be given the means needed for its normal development, both materially and spiritually" and states that "the hungry child should be fed."

1948: Universal Declaration of Human Rights. This human rights landmark, adopted by the United Nations General Assembly, proclaims in article 25 that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services . . . ." This article also affirms that "motherhood and childhood are entitled to special care and assistance."

1959: Declaration of the Rights of the Child. Adopted unanimously by the United Nations General Assembly, the Declaration states in principle 4 that children "shall be entitled to grow and develop in health" and that children "shall have the right to adequate nutrition, housing, recreation and medical services."

1966: International Covenant on Economic, Social and Cultural Rights. Adopted by the United Nations and ratified by 137 States as of mid-September 1997, this Covenant was the first to spell out States' obligations to respect people's economic, social and cultural rights. Article 11 affirms the right of everyone to an adequate standard of living, including adequate food, and the "fundamental right of everyone to be free from hunger." The Covenant also mandates States parties to take steps to realize this right, including measures "to improve methods of production, conservation and distribution of food."

1986: Declaration on the Right to Development. Article 1 of the Declaration, which was adopted by the United Nations General Assembly, proclaims that the right to development "is an inalienable human right," with all people entitled to participate in and enjoy economic, social, cultural and political development "in which all human rights and fundamental freedoms can be fully realized." Article 8 calls for all States to ensure equal opportunity for all in access to health services and food.

1989: Convention on the Rights of the Child. The most widely ratified human rights treaty, the Convention establishes as international law all rights to ensure children's survival, development and protection. Article 24 mandates States parties to recognize children's right to the "highest attainable standard of health" and to take measures to implement this right. Among key steps, States are mandated to provide medical assistance and health care to all children, with an emphasis on primary health care; combat disease and malnutrition, within the framework of primary health care, through the provision of adequate nutritious foods, and safe drinking water and adequate sanitation; and provide families with information about the advantages of breastfeeding.

Ratifications: 191 States as of mid-September 1997, with only two countries — Somalia and the United States — yet to ratify.

1990: World Declaration and Plan of Action on the Survival, Protection and Development of Children. The unprecedented numbers of world leaders attending the World Summit for Children committed themselves to "give high priority to the rights of children" in the Summit's World Declaration. The Summit's Plan of Action set out the steps in 7 major and 20 supporting goals for implementing the Declaration. Reducing severe and moderate malnutrition by half of 1990 levels among under-five children by the end of the century is the main nutrition goal.

The 7 supporting nutrition goals are: reduction of low-weight births to less than 10 per cent of all births; reduction of iron deficiency anaemia in women by one third of 1990 levels; virtual elimination of iodine deficiency disorders; virtual elimination of vitamin A deficiency; empowerment of all women to exclusively breastfeed their children for about the first six months; institutionalization of growth monitoring and promotion; and dissemination of knowledge and supporting services to increase food production to ensure household food security.

tion of the Rights of the Child in 1924 (Panel 4).

Under the 1979 Convention on the Elimination of All Forms of Discrimination against Women, for example, States parties must ensure that women receive full and equal access to health care, including adequate nutrition during pregnancy and lactation. And the 1990 World Summit for Children, with a Plan of Action that recognized the devastating effects of malnutrition on women and their children, set specific nutritional goals for children and women, including access to adequate food during pregnancy and lactation; the promotion, protection and support of breastfeeding and complementary feeding practices; growth monitoring with appropriate follow-up actions; and nutritional surveillance.

But the right to nutrition receives its fullest and most ringing expression in the 1989 Convention on the Rights of the Child, whose 191 ratifications as of late 1997 make it the most universally embraced human rights instrument in history.

Under the Convention, which commits States parties to realize the full spectrum of children's political, civil, social, economic and cultural rights, virtually every government in the world recognizes the right of all children to the highest attainable standard of health, to facilities for the treatment of illness and for the rehabilitation of health — specifically including the right to good nutrition and its three vital components: food, health and care.

Under the Convention's pre-eminent guiding principle, good child nutrition is a right because it is in the "best interests of the child."

Article 24 of the Convention specifies that States parties must take "appropriate measures" to reduce infant and child mortality, and to combat disease and malnutrition through the use of readily available technology and through the provision of adequate, nutritious foods and safe drinking water.

The world is obligated to ease child malnutrition on the basis of international law, scientific knowledge, practical experience and basic morality.

The ravages caused by malnutrition on individuals, families and societies are preventable. The measures needed to reduce and end it are becoming increasingly well understood. And the gains for humanity from doing so — in greater creativity, energy, productivity, well-being and happiness — are immeasurable.

Why time is of the essence

A child's organs and tissues, blood, brain and bones are formed, and intellectual and physical potential is shaped, during the period from conception through age three.

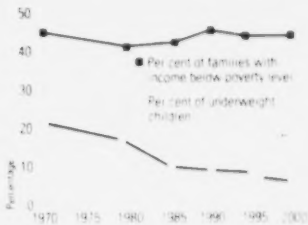
Since human development proceeds particularly rapidly for the first 18 months of life, the nutritional status of pregnant and lactating mothers and young children is of paramount importance for a child's later physical, mental and social development. It is not an exaggeration to say that the evolution of society as a whole hinges on the nutrition of mothers and children during this crucial period of their lives.

The healthy newborn who develops from a single cell — roughly the size of the period at the end of this sentence — will have some 2 billion cells and weigh an average of 3,250 grams.[7] Under optimal conditions, the infant will double its birthweight in the first four months of life; by its third birthday, a healthy child will be four and a half times as heavy.

Brain cells proliferate at the rate of 250,000 a minute, beginning in the third week of gestation.[7] By the time of birth, a child will have 100 billion

Fig. 4 Poverty and malnutrition in Latin America and the Caribbean

Malnutrition in Latin America decreased from an estimated 21% in 1970 to 7.2% in 1997, while the rate of poverty, measured by income level, fluctuated only slightly over the last three decades, dropping from 45% in 1970 to 44% in 1997. These trends show that the reduction of malnutrition is not solely dependent on increases in income. In Latin America, the gains in reducing malnutrition are attributed at the underlying level to good care practices and access to basic health services, including family planning, and water/sanitation services; and at the basic level to women's empowerment in terms of their education and the cash resources they control.



Source: Aaron Lechtig, "Child Undernutrition in Latin America and the Caribbean: Trends, reasons and lessons", presented to the Workshop on the Changing Conditions of the Child in Latin America and the Caribbean, University of Notre Dame, South Bend (USA), 26 September 1997, based on: ACC/SCN, "Update of the Nutrition Situation 1996 : Summary of results for the Third Report on the World Nutrition Situation", ACC/SCN, Geneva, 1996 and ECLAC, Social Panorama of Latin America 1996, Santiago (Chile), 1996.

BEST COPY AVAILABLE

UNICEF/93 1972/Pirozzi

Women need rest and protection from overwork during pregnancy. As long as the unequal division of labour so common around the world persists, the caring practices vital to the nutritional well-being of children will suffer. In Niger, a pregnant woman carries several large bowls of sorghum.

neurons, linked by synapses, the complex nerve junctions that begin forming in the 13th week of gestation.[20]

Proliferating most rapidly after birth, in large part because of the stimulation and care a child receives, millions upon millions of these junctions will be forged by the time a healthy child reaches the age of two and a half. Physical, mental and cognitive development depend on these communication links between neurons. Without them, messages would dead-end, muscles would not flex, and the complex processes of thought and learning would not be possible.

Growth during the foetal stage depends on how well nourished a woman was before pregnancy, as well as how much weight she gains while she is pregnant. Gains in weight are essential for the development of new maternal and foetal tissues, and for maternal body maintenance and energy.

Since the foetus relies entirely on the mother for nutrients, pregnant women not only need to gain weight but also must maintain an optimal intake of essential nutrients such as iron and iodine.

But fulfilling these interlocking food, health and care needs can be a struggle for many women in the developing world, where economic, social and cultural factors may be a barrier to good nutrition.

Currently about 24 million low-birthweight babies are born every year, which is about 17 per cent of all live births. Most are born in developing countries, where the main cause of low birthweight is not premature birth, as it is in the industrialized world, but poor foetal growth.

Low-birthweight babies, defined as weighing less than 2.5 kilograms, are at greater risk of dying than infants of average weight. If they survive, they will have more episodes of illness, their cognitive development may be impaired, and they are also more likely to become malnourished. Evidence is also mounting that low birthweight predisposes children to a high risk of diabetes, heart disease and other chronic conditions later in life.

The measures that are essential for an expectant mother — care and rest, a reduced workload and a well-balanced diet that affords ample energy, protein, vitamins, minerals and essential fatty acids — are equally important when a woman is breastfeeding her child.

Breastfeeding perfectly combines the three fundamentals of sound nutrition — food, health and care — and is the next critical window of nutritional opportunity after pregnancy. While not all children are breastfed, it remains an important protection for children (see also page 47).

Because breastmilk contains all the nutrients, antibodies, hormones and antioxidants an infant needs to thrive, it plays a pivotal role in promoting the mental and physical development of children.

Breastfed infants not only show better immune responses to immunizations, but their intake of breastmilk also protects the mucous membranes that line their gastrointestinal and respiratory tracts, thus shielding them against diarrhoea and upper respiratory tract infections.[21]

In countries where infant mortality rates are high or moderately high, a bottle-fed baby in a poor community is 14 times more likely to die from diarrhoeal diseases and 4 times more likely to die from pneumonia than a baby that is exclusively breastfed.[22]

Breastfeeding also has cognitive benefits. In one study, breastfed subjects generally had IQs that were about 8 points higher than children who had been bottle-fed, and higher achievement scores as well.[23] Nutri-

BEST COPY AVAILABLE

tionists theorize that the effect may be the result of the growth-promoting long-chain fatty acids of breastmilk. It may also be related to the fact that breastfed infants have fewer infections and, as healthier infants, they take a greater interest in their environment and thus learn more than ill infants.

However, for mothers infected with HIV, breastfeeding's enormous value as a bulwark against malnutrition, illness and death must be weighed against the 14 per cent risk that they may transmit the virus to their infants through breastmilk — and the vastly greater risk, especially in poor communities with inadequate water and sanitation, that feeding their children artificially will lead to infant deaths from diarrhoeal dehydration and respiratory infections.

During the second half of a child's first year, synaptic growth in the prefrontal cortex of the brain, the seat of forethought and logic, consumes twice the amount of energy required by an adult brain. Much of this synaptic growth is believed to result from the caring stimulation that an infant and young child receives — the nurturing, feeding and learning play in which parents engage their children.

After about six months, for optimal growth and development, a child needs to be fed frequently with energy-rich, nutrient-dense foods. The failure to make such investments at the right time can never be remedied later. An adequate intake of micronutrients, especially iodine, iron, vitamin A and zinc, remains crucial.

Spotlighting the causes

An understanding of the complex and subtle causes of malnutrition is important to appreciate the scale and depth of the problem, the progress achieved to date and the possibilities for further progress that exist.

Malnutrition, clearly, is not a simple problem with a single, simple solution. Multiple and interrelated determinants are involved in why malnutrition develops, and a similarly intricate series of approaches, multifaceted and multisectoral, are needed to deal with it (Fig. 5).

Immediate causes

The interplay between the two most significant immediate causes of malnutrition — inadequate dietary intake and illness — tends to create a vicious circle: A malnourished child, whose resistance to illness is compromised, falls ill, and malnourishment worsens. Children who enter this malnutrition-infection cycle can quickly fall into a potentially fatal spiral as one condition feeds off the other (Fig. 6).

Malnutrition lowers the body's ability to resist infection by undermining the functioning of the main immune-response mechanisms. This leads to longer, more severe and more frequent episodes of illness.

Infections cause loss of appetite, malabsorption and metabolic and behavioural changes. These, in turn, increase the body's requirements for nutrients, which further affects young children's eating patterns and how they are cared for (see also page 27).

Underlying causes

Three clusters of underlying causes lead to inadequate dietary intake and infectious disease: inadequate access to food in a household; insufficient health services and an unhealthful environment; and inadequate care for children and women.

❑ Household food security

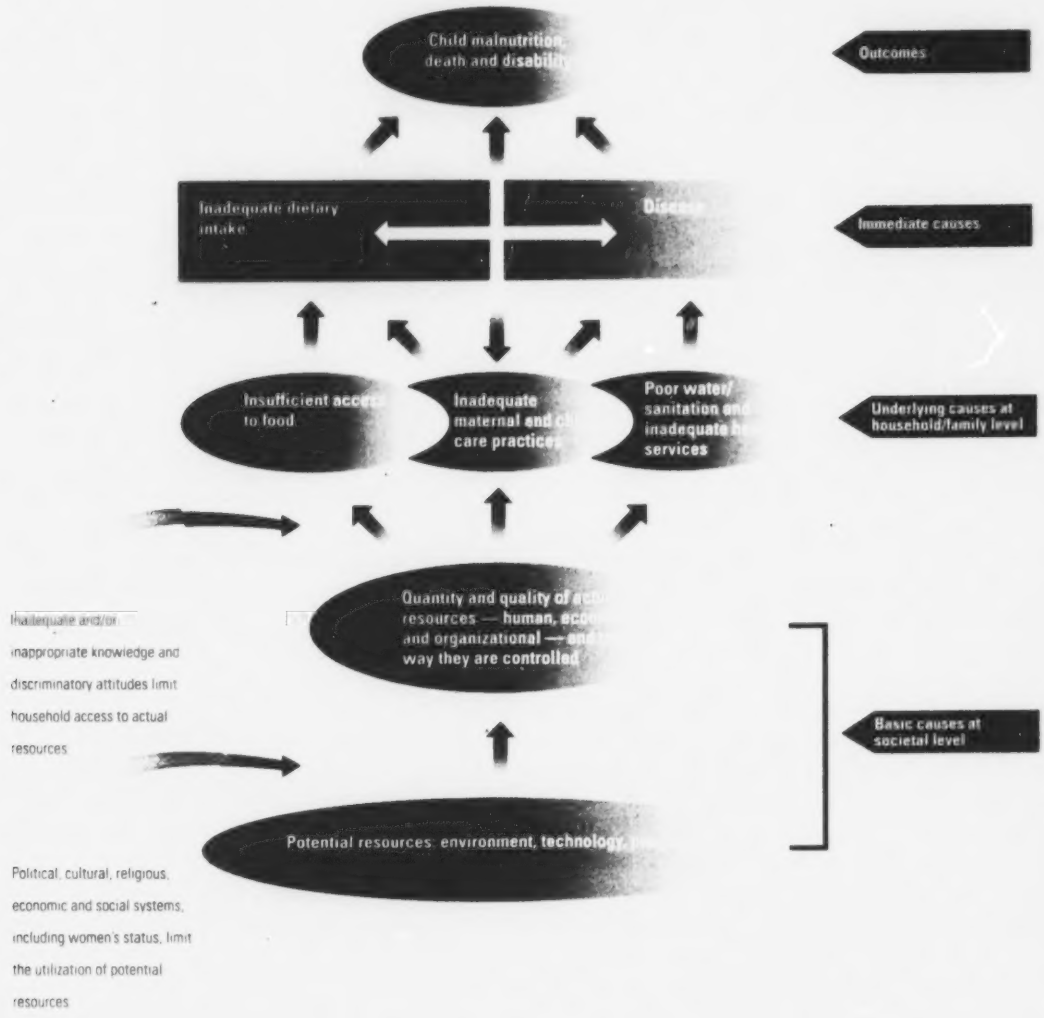
This is defined as sustainable access to safe food of sufficient quality and quantity — including energy, protein and micronutrients — to ensure ade-

UNICEF-5228/Toutounji

A complex interplay of factors such as household access to food, women's status, caring practices, disease and access to safe water, sanitation and basic health services affect a child's nutrition. A girl stands in the doorway of her home in Lebanon.

Fig. 5 Causes of child malnutrition

This conceptual framework on the causes of malnutrition was developed in 1990 as part of the UNICEF Nutrition Strategy. The framework shows that causes of malnutrition are multisectoral, embracing food, health and caring practices. They are also classified as immediate (individual level), underlying (household or family level) and basic (societal level), whereby factors at one level influence other levels. The framework is used, at national, district and local levels, to help plan effective actions to improve nutrition. It serves as a guide in assessing and analysing the causes of the nutrition problem and helps in identifying the most appropriate mixture of actions.



Source: UNICEF, 1997.

BEST COPY AVAILABLE

quate intake and a healthy life for all members of the family.

In rural areas, household food security may depend on access to land and other agricultural resources to guarantee sufficient domestic production.

In urban areas, where food is largely bought on the market, a range of foods must be available at accessible prices to ensure food security. Other potential sources of food are by exchange, gifts from friends or family and in extreme circumstances food aid provided by humanitarian agencies.

Household food security depends on *access* to food — financial, physical and social — as distinct from its *availability*. For instance, there may be abundant food available on the market, but poor families that cannot afford it are not food secure.

For the poor, therefore, household food security is often extremely precarious. Agricultural production varies with the season and longer-term environmental conditions. Families selling crops may find themselves paid fluctuating prices depending on a variety of factors beyond their control, while those who need to buy food may encounter exorbitant prices.

Families living on the edge of survival have few opportunities to build up sufficient stocks of food, or to develop alternatives that would cushion them in times of hardship. So while poor families may have adequate access to food for one month, what is essential is access that is consistent and sustainable.

Women have a special role to play in maintaining household food security. In most societies, they are solely responsible for preparing, cooking, preserving and storing the family's food — and in many societies they have the primary responsibility of producing and purchasing it. For household food security to translate into good nutrition, this often overwhelming burden of work must be redistributed or reduced so that other needs of children, also related to nutrition, can be met.

Fig. 6 Inadequate dietary intake/disease cycle

Inadequate dietary intake and infection operate in a vicious cycle that accounts for much of the high morbidity and mortality seen in developing countries. When children don't eat enough or well enough, their immune system defences are lowered, resulting in greater incidence, severity and duration of disease. Disease speeds nutrient loss and suppresses appetite — so sick children tend not to eat as they should — and the cycle continues.

Source: Andrew Tomkins and Fiona Watson, Malnutrition and Infection, ACC/SCN, Geneva, 1989.

Health services, safe water and sanitation

An essential element of good health is access to curative and preventive health services that are affordable and of good quality.

Families should have a health centre within a reasonable distance, and the centre's staff should be qualified and equipped to give the advice and care needed. According to the United Nations Development Programme (UNDP), access varies widely, but in as many as 35 of the poorest countries 30 to 50 per cent of the population may have no access to health services at all.[11]

In Africa, the programme known as the Bamako Initiative was launched

Panel 5

Growth and sanitation: What can we learn from chickens?

UNICEF/96-0234/Toutounji

Poultry farmers have known for some time that a chicken living in a dirty environment is a chicken that grows poorly. Even if it is not overtly sick all the time, it gains little weight.

Is there a message here about the growth of children? Because growth, like other nutrition outcomes, is determined most immediately by diet and illness status, the answer, at least in part, may be yes. Infectious illness — which spreads more easily in unsanitary conditions — leads to poorer dietary intake and poor use of the nutrients ingested. This, in turn, leads to lower resistance to infection, and so on, in a vicious diet-infection cycle (Fig. 6).

Now studies suggest that an unsanitary environment may have effects beyond those associated with particular bouts of illness. Researchers believe that children living in such conditions may suffer from a fairly constant, low-level challenge to their immune systems that impairs their growth, as has been shown in domestic fowl. Dr. Noel Solomons of the Centre for Studies of Sensory Impairment, Aging and Metabolism and colleagues suggest that along with classifying children as healthy (having no clinical illness) and acutely infected (with signs of illness readily detectable), there is also a category of "inapparently infected." Children who are inapparently infected have no signs of clinical illness but do have abnormal levels of some immunological indicators. Such inapparent infections and the chronic low-level stimulation of the immune system associated with life in unsanitary conditions may mean that nutrients go to support the body's immune response rather than growth.

Poverty occurs in both South Asia and sub-Saharan Africa, but rates of malnutrition, especially stunting, are much higher in South Asia. A number of hypotheses have been advanced to explain this difference, and one is that it is due to poorer sanitation and hygiene practices, the much greater population density and degree of overcrowding in South Asia.

Certainly, the dangers posed by poor access to potable water are well known. A recent review of data collected by the Demographic and Health Surveys, a USAID-supported project, indicates that health and nutrition benefits from improved sanitation, especially improved excreta disposal, may be even greater than those associated with better access to safe water alone.

A group led by Dr. Reynaldo Martorell of Emory University (US) has designed a study to shed light on the relationship between sanitation and growth stunting. This study would follow 800 children in two locations in South Asia and 800 more in two locations in sub-Saharan Africa from the time their mothers become pregnant to when they are two years old and would collect a wide range of information on sanitation, hygiene practices and other aspects of the household environment. The children's growth would be measured frequently along with indicators of feeding practices, diet quality, illness and many other factors. UNICEF is helping to secure funds for this study.

Establishing a link between sanitation conditions and child growth in a cause-and-effect way will go a long way to clarifying priorities for action in this area. Such a link will also reveal just how useful the 'dirty chicken' model is for understanding stunted growth among children.

Photo: Unsanitary living conditions cause illnesses that threaten children's health and growth. New research now suggests that growth is harmed in unhygienic surroundings even before acute infection occurs. In Egypt, a girl amid mounds of garbage and animal waste.

in 1987 to address the crisis in health care that came on the heels of budget cuts and economic decline in the 1980s. It is a strategy for improving health services by moving their control, management and even some of their financing out of central jurisdiction and into communities.

Now in place in a number of countries in Africa, the Initiative's principles are being adopted and adapted in other regions as well. The results are promising: The supply of basic drugs in health centres is more consistent, and management committees, composed of village residents, help ensure that people pay reasonable fees for basic services and that the funds generated are well used.

Nevertheless, the fact remains that many people do not have access to health care and may be further deterred from seeking timely and appropriate care by user fees for health care services.

The additional challenge of creating a climate where preventive health and nutritional care components are also integrated into the Bamako model is harder to realize. Because they are less tangible to communities, preventive health and nutrition services are also often less in demand than curative care. Prevention, nonetheless, is vital and cost-effective.

In terms of environmental health, the lack of ready access to a safe water supply and proper sanitation and the unhygienic handling of food as well as the unhygienic conditions in and around homes, which cause most childhood diarrhoea, have significant implications for the spread of infectious diseases.

Moreover, when food is handled under unhygienic conditions and the environment is unhealthful, littered with animal and human wastes, young children are also more prone to infection by intestinal parasites, another cause of poor growth and malnutrition (Panels 5 and 20).

Also, women and children are usually responsible for fetching the water needed for domestic use, a task that drains considerable time and energy. Depending on how much the distance to the water source is shortened, it has been estimated that women could conserve large reserves of energy, as many as 300 to 600 calories a day.[7]

Progress has been made in improving access to safe water. But more than 1.1 billion people lack this fundamental requirement of good nutrition.[8]

As for sanitary waste disposal, the world is actually losing ground, with the rate of coverage falling in both urban and rural areas. Only 18 per cent of rural dwellers had access to adequate sanitation services at the end of 1994,[9] and overall some 2.9 billion people lack access to adequate sanitation.[10]

Caring practices

Experience has taught that even when there is adequate food in the house and a family lives in a safe and healthful environment and has access to health services, children can still become malnourished.

Inadequate care for children and women, the third element of malnutrition's underlying causes, has only recently been recognized and understood in all its harmful ramifications.

Care is manifested in the ways a child is fed, nurtured, taught and guided. It is the expression by individuals and families of the domestic and cultural values that guide them.

Nutritionally, care encompasses all measures and behaviours that translate available food and health resources into good child growth and development. This complex of caring behaviours is often mistakenly assumed to be the exclusive domain of mothers. It is, in fact, the responsibility and domain of the entire family

Experience has taught that even when there is adequate food in the house and a family lives in a safe and healthful environment and has access to health services, children can still become malnourished.

BEST COPY AVAILABLE

The introduction of complementary foods is a critical stage. A child will be put at increased risk of malnutrition and illness if these foods are introduced much before the age of six months, or if the preparation and storage of food in the home is not hygienic.

and the community, and both mothers and children require the care of their families and communities.

In communities where mothers are supported and cared for, they are, in turn, better able to care for young children.

Among the range of caring behaviours that affects child nutrition and health, the following are most critical:

► ***Feeding:*** As we have seen, exclusive breastfeeding for about six months, and then continued breastfeeding with the addition of safe, high-quality complementary foods into the second year of life, provides the best nourishment and protects children from infection.

The introduction of complementary foods is a critical stage. A child will be put at increased risk of malnutrition and illness if these foods are introduced much before the age of six months, or if the preparation and storage of food in the home is not hygienic.

On the other hand, a child must have complementary foods at the six-month point, since breastmilk no longer meets all nutritional needs. Delaying the switch-over much beyond six months of age can cause a child's growth to falter.

From about 6 months to 18 months of age, the period of complementary feeding, a child needs frequent feeding — at least four times daily, depending on the number of times a child is breastfed and other factors — and requires meals that are both dense in energy and nutrients and easy to digest.

The foods a family normally eats will have to be adapted to the needs of small children, and time must be made available for preparing the meals and feeding children.

Good caring practices need to be grounded in good information and knowledge and free of cultural biases and misperceptions. In many cultures, for instance, food and liquids are withheld during episodes of diarrhoea in the mistaken belief that doing so will end the diarrhoea. The practice is dangerous because it denies the child the nutrients and water vital for recovery.

Other behaviours that affect nutrition include whether children are fed first or last among family members, and whether boys are fed preferentially over girls. In a number of cultures and countries, men, adult guests and male children eat before women and girls.

The level of knowledge about hygiene and disease transmission is another important element of care. It involves food preparation and storage, and whether both those who prepare the food and those who eat it wash their hands properly before handling it.

Ideas concerning appropriate child behaviour are also important. If, for instance, it is considered disrespectful for a child to ask for food, feeding problems can occur.

► ***Protecting children's health:*** Similarly rooted in good knowledge and information is the caring act of seeing that children receive essential health care at the right time. Early treatment can prevent a disease from becoming severe.

Immunizations, for example, have to be carried out according to a specific schedule. Sound health information needs to be available to communities, and families and those caring for children need to be supported in seeking appropriate and timely health care.

Therapeutic treatment for a severely malnourished child in the hospital is far more expensive than preventive care. According to a 1990 US Department of Agriculture study,

nutrition investments for pregnant women were very cost-effective: Every $1 spent on prenatal nutrition care yielded an average savings of about $3 in reduced medical costs for the children during the first two months after birth.[29]

A study in Ghana has also found savings in health care costs: Children receiving vitamin A supplements made fewer clinic visits and had lower hospital admission rates than children not receiving the supplement.

► ***Support and cognitive stimulation for children:*** For optimal development, children require emotional support and cognitive stimulation, and parents and other caregivers have a crucial role in recognizing and responding to the actions and needs of infants.

The link between caring stimulation and malnourished children is also important: Several studies have found that malnourished children who were given verbal and cognitive stimulation had higher growth rates than those who were not.[30]

Breastfeeding affords the best early occasion to provide support and stimulation. It enables mothers and their infants to develop a close emotional bond that benefits both. All children need — and delight in — the kind of play and stimulation that is essential for their cognitive, motor and social development.

Verbal stimulation by caregivers is particularly important for a child's linguistic development. Ill or malnourished children who are in pain and have lost their appetite need special attention to encourage them to feed and take a renewed interest in their surroundings during recovery.

In addition to improved nutrient intake, optimal cognitive development also requires stimulation of, and regular interaction with, young children. The quality of these actions can be enhanced through education of parents and other caregivers. Child-to-child programmes, for example, can provide simple resources to older children to improve the care, development and nutritional well-being of their younger siblings.

Policy makers need to recognize the significance of such measures and actions and take them into account when devising policy and programmes.

But the timing must be carefully planned: Many early child development activities concentrate on children who are age three and older when the focus should be on children up to the age of three and should link care, good feeding and psychosocial activities.

► ***Care and support for mothers:*** As long as the unequal division of labour and resources in families and communities continues to favour men, and as long as girls and women face discrimination in education and employment, the caring practices vital to the nutritional well-being of children will suffer.

Women, on average, put nearly twice the hours of men into family and household maintenance. In Bangladesh, India and Nepal, for example, girls and women spend three to five hours more a week than boys and men in tasks such as carrying fuel and growing and processing food.[31]

They then spend an additional 20 to 30 hours a week performing other unpaid household work. If the burdens they carry are not better and more equitably distributed, both they and their caring role will suffer.

The elements of care most critical for women during pregnancy and lactation include extra quantities of good-quality food, release from onerous labour, adequate time for rest, and skilled and sensitive pre- and post-natal health care from trained practitioners.

UNICEF/95-0912/Lemoyne

Exclusive breastfeeding for the first six months of a child's life not only provides the best nourishment and protection from infection, but also enables mothers and their infants to develop close emotional bonds. A woman breastfeeds her three-month-old baby in the Federal Republic of Yugoslavia

Panel 6

Breastmilk and transmission of HIV

Breastfeeding confers enormous benefits, preventing malnutrition and illness, saving lives and money. It is also, however, one way an HIV-positive mother could transmit the virus to her infant. A child stands the greatest risk — believed to be 20 per cent — of vertical or mother-to-child transmission during the time of late pregnancy and childbirth. There is an additional 14 per cent risk that an infant will become infected through breastmilk.

This risk of infection through breastfeeding needs to be weighed against the great dangers posed by artificial feeding: In communities where sanitation is inadequate and families are poor, death from diarrhoea is 14 times higher in artificially fed infants than in those who are breastfed. If HIV-positive women and those who fear HIV (without actually being infected) were to abandon breastfeeding in large numbers, without safe and reliable alternatives for feeding their children, the ensuing infant deaths from diarrhoea and respiratory infections could vastly outnumber those from HIV.

The dilemma facing an HIV-positive woman who does not have easy access to safe water, who does not have enough fuel to sterilize feeding bottles and prepare alternatives to breastmilk, or who cannot afford to buy sufficient formula to ensure her child's nutrition is a wrenching one that no mother can solve on her own. Support for women facing this dilemma is imperative, as the Joint United Nations Programme on HIV/AIDS (UNAIDS) made clear in 1996. The following measures are important starting points:

- Pregnant women should have access to voluntary and confidential counselling and testing to determine their health status. If they are HIV positive, they should receive appropriate treatment to reduce the risk of vertical transmission. If they are HIV negative, health education is vital to help them and their partners remain that way.

- HIV-positive mothers should be informed of the risks of both vertical transmission through breastfeeding and infections associated with artificial feeding in their local environment. Each woman should be assisted by HIV counsellors or health professionals to understand these risks and then make her own decision.

- If an HIV-positive mother has access to adequate breastmilk substitutes that she can prepare safely, then she should consider artificial feeding. Other alternatives include wet-nursing by an HIV-negative woman, which may be acceptable in some cultures. Heat treatment of expressed breastmilk (62.5°C for 30 minutes) destroys the virus, which may be a good choice for some women.

- When mothers who test positive for HIV choose not to breastfeed but are unable to or cannot afford feeding alternatives, help will be needed from a range of parties, including governmental and partner agencies. Attention must be paid to the needs of the most disadvantaged women, which include improved water and sanitation and attentive family health care.

These measures should be part of an integrated strategy to reduce vertical transmission since breastfeeding is only a small part of the problem. Access to voluntary, confidential testing and counselling is key to any strategy to reduce vertical transmission. Access to a range of prenatal and obstetric care measures associated with reduced transmission risk is also essential.

Studies now in progress will soon give a better understanding of the mechanisms, timing and risks of vertical transmission. It may be possible in a few years to offer all women low-cost, easily delivered services that will minimize or even eliminate the risk of vertical transmission. For now, access to the testing, counselling, information and other services noted above should be high priorities.

The AIDS pandemic has introduced new and volatile considerations and aspects of care into already sensitive areas of human behaviour and interaction. High priority should be given to improving access to services that help minimize the risk of HIV transmission to women before, during and after pregnancy, as well as to their partners (Panel 6).

Cultural norms and misconceptions affect the care women receive during pregnancy. In some culturally conservative communities in parts of Asia, for example, fish, meat, eggs and fat are not part of the diets of pregnant women because it is feared they will make a baby too large and difficult to deliver. Research shows, however, that better maternal diet can improve the birthweight of children in many cases without causing significantly increased head circumference of the newborn, which is the factor most likely to put small women at risk (Panel 7).

The adjustment of workload is another aspect of the care accorded women during pregnancy — and one with powerful ramifications.

A survey in one village in the Gambia, for example, found that even during periods of relatively low seasonal agricultural activity, women gained on average just 5.5 kilograms during pregnancy — only about half of the recommended weight gain that women need to sustain their developing foetus.

Reductions in a woman's workload during pregnancy, combined with more food of good quality, improve the nutritional status of a woman and her unborn child and reduce the risk that the child will have a low birthweight.

In Viet Nam, when men assumed some of their pregnant wives' responsibilities during the third trimester of pregnancy, women rested more, and their infants weighed more at birth. In Indonesia, infants born to women who received a food supplement did not weigh more at birth, but they developed better during the first year of life.

The fact that women are usually the primary caregivers does not mean that men, families and communities are exempt from care-giving responsibilities.

The often oppressive and demanding patriarchal environment in which millions of women live must give way to an equal partnership in which women enjoy autonomy and the sense of accomplishment that comes from building skills and capacities.

At the same time, girls need to be free from pressures to marry early. A study in West Africa, for example, found that nearly 20 per cent of girls in rural areas of the Gambia and Senegal and 45 per cent of girls in Niger marry before the age of 15.

Figures such as these underscore the great need for girls and women to be involved in major personal decisions, including not only their marrying age but also how closely the births of their children will be spaced.

Adolescent pregnancy is a major risk factor for both mother and infant, as the girl may not have finished growing before her first pregnancy, making childbirth dangerous.

The infant of a very young mother may have a low birthweight (Fig. 7). Higher risks of toxaemia, haemorrhage, anaemia, infection, obstructed labour and perinatal mortality are all associated with childbearing in adolescence.

A number of measures are essential, therefore, to enable women and girls to develop their skills and abilities. These include ensuring their access to family and community resources, such as credit, and to education and information.

The often oppressive and demanding patriarchal environment in which millions of women live must give way to an equal partnership.

Panel 7

High-energy biscuits for mothers boost infant survival by 50 per cent

UNICEF/91 0873/Prozn

In the Gambia, well-targeted interventions to improve the nutrition of pregnant women are making a difference in the birthweight of their babies, and at the same time sharply reducing the risk of babies dying during, or shortly after, birth.

A large, controlled study in the country's rural West Kiang region has determined that the number of low-birthweight babies fell by nearly 40 per cent and that stillbirth and perinatal mortality rates in infants were almost 50 per cent lower when pregnant women received a daily ration of locally prepared, energy-rich biscuits. These remarkable results strengthen the argument for providing food supplements to pregnant women to reduce low birthweight.

"The study clearly demonstrates that improved maternal nutrition, deliverable through a primary health care system, can have highly beneficial effects when efficiently targeted at women in genuine need," says one of the study's authors, Dr. Sana Ceesay, of the Dunn Nutrition Centre affiliated with the University of Cambridge, which has been working in partnership with the Gambian Health Department. The findings were published in the *British Medical Journal* in September 1997.

UNICEF estimates that each year over 24 million babies are born below the low-birthweight threshold of 2.5 kg, and that 95 per cent of these births occur in the developing world. Low birthweight puts infants at a greatly increased risk of neonatal death and is an important cause of poor growth and development in later childhood. It can be due to a number of factors, including a woman's small size, uterine infections, smoking, low oxygen levels in the blood (due to excessive work or high altitude) and malarial infection. However, when all these factors are equal, the incidence of low birthweight is higher in economically deprived mothers than in affluent ones.

The most likely explanation for the difference is that inadequate maternal nutrition suppresses foetal growth. It has often been difficult, nevertheless, to show real benefits to infants from improvements to a mother's diet during pregnancy. The study in the Gambia provides such evidence.

In this part of West Africa, previous studies had indicated that pregnant women — challenged as many women are by the high energy demands of water and fuel collection, agricultural work and child-care activities but also by the energy and other nutrient needs of pregnancy — did not eat enough or well enough to meet all these needs. The growth of their babies was thus threatened.

The five-year, prenatal supplementation trial covered 28 villages in one region of the Gambia. In the intervention villages, pregnant mothers received daily high-energy groundnut-based biscuits, providing 1,000 kcal/day on average after 20 weeks of pregnancy. The biscuits were made from local ingredients and were baked by two village bakers in traditional clay ovens. Women in control villages received antimalarials, iron/folate supplements and antenatal care as did women in the intervention villages, but they did not receive the biscuits during pregnancy. Field workers weighed all the women in the study at regular intervals, and weighed and measured all infants at delivery.

The biscuit supplement caused a highly significant increase in birthweight, reducing the numbers of infants classified as low birthweight by 39 per cent. Particularly noteworthy

was the reduction in low birthweight occurring in births during the annual 'hungry season', when birthweights normally are lower than in the harvest season, as a result of poor maternal nutrition combined with hard seasonal agricultural work. (It is unlikely that food supplements would have the same impact on pregnant women who are not chronically energy-deficient.)

In addition to these remarkable benefits, this study refutes the idea prevailing in some circles that improving the diet of pregnant women will cause them to suffer higher rates of obstetrical complications because of the larger size of their newborns. Birthweight was indeed higher in the children of women who received the biscuits, but head circumference, which is the factor more closely related to pelvic disproportion in birth, was only slightly greater. The rate of obstetric complications of this kind was not higher in the supplemented women.

Photo: A healthy newborn sleeps peacefully in the Gambia.

Basic causes

It is often said that poverty at the family level is the principal cause of child malnutrition. While it is true that a lack of resources and malnutrition often go hand in hand, this statement tells only part of the story.

Many poor families do in fact receive adequate nutrition, and malnutrition is found in many better-off families.

The broader explanation lies within a fuller understanding of the different types of resources necessary for good nutrition, and of the factors that affect families' ability to access and control these resources.

The three components of nutrition — food, health and care — interact closely in their influence on family life. Often efforts to fulfil one precondition for good nutrition compete for the same resources required to fulfil another condition.

For example, if a woman has to spend excessive time in producing food to achieve household food security, her ability to provide adequate child care can be compromised. The result may be malnutrition in her young child.

Political, legal and cultural factors at the national and regional levels may defeat the best efforts of households to attain good nutrition for all members.

These include the degree to which the rights of women and girls are protected by law and custom; the political and economic system that determines how income and assets are distributed; and the ideologies and policies that govern the social sectors.

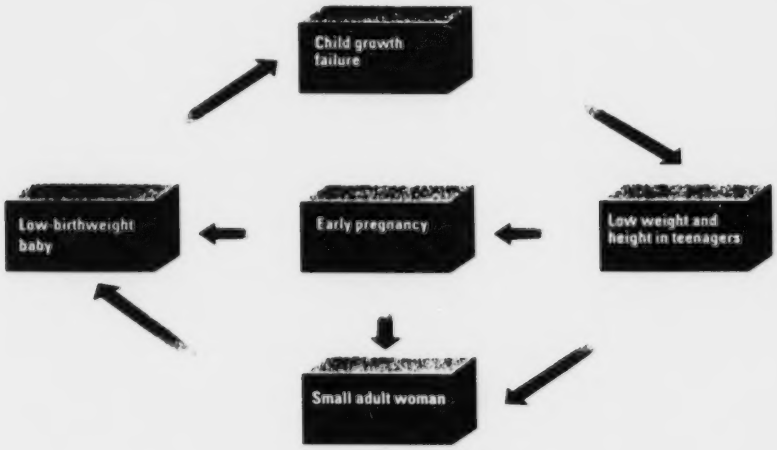
For example, where it is known and appreciated by everyone in society — men and boys, women and girls, teachers and religious leaders, doctors and nurses — that women in the late stages of pregnancy need rest and protection from overwork, families are more apt to receive the social support they need to ensure this protection.

UNICEF/90-0017/Tolmie

How women are valued and treated in society, including their level of education, affects their ability to feed and care for their children. A first-grader in Colombia takes lunch before class begins.

Fig. 7 Intergenerational cycle of growth failure

The cycle of poor nutrition perpetuates itself across generations. Young girls who grow poorly become stunted women and are more likely to give birth to low-birthweight infants. If those infants are girls, they are likely to continue the cycle by being stunted in adulthood, and so on, if something isn't done to break the cycle. Adolescent pregnancy heightens the risk of low birthweight and the difficulty of breaking the cycle. Support is needed for good nutrition at all these stages — infancy, childhood, adolescence and adulthood — especially for girls and women.



Source: ACC/SCN, Second Report on the World Nutrition Situation. Vol. I: Global and Regional Results, ACC/SCN, Geneva, 1992.

In places where there is a tradition of non-discrimination against women in law and custom, women are more likely to have good access to resources, including credit, and to the decision-making power that can enable them to make the best use of services for themselves and their children.

* * * *

There is no doubt that while economic poverty is not the only kind of poverty that eventually affects nutrition, it is still an important factor.

Overcoming entrenched poverty and underdevelopment requires resources and inputs that few developing countries, particularly the poorest, can muster, either on their own, through existing levels of private external investment and loans, or through current patterns of official assistance and loans.

In 1995, for example, aggregate resource flows to the developing world from all sources totalled $232 billion, including $59 billion in official development loans and grants and $156 billion in private resources. Middle-income countries were the biggest recipients of the private investments and loans: Two thirds went to them and one third to low-income countries.

The two regions of the world with the highest rates of childhood malnutrition — sub-Saharan Africa and South Asia — received only $1.6 billion and $5.2 billion respectively.

And although bright spots exist in terms of investment and trade in sub-Saharan Africa, the problems of the continent's economies remain stark, including relatively low levels of internal demand and the import quotas industrialized countries impose on African manufactured goods.

At the same time, developing countries overall owed more than $2 trillion in external debt in 1995. Sub-Saharan Africa, for example, paid $13.6 billion in debt servicing in 1995 — nearly double what it spent on health services. And developing countries bear by far the greatest proportion of the global burden of disease, which drains their human and economic resources.

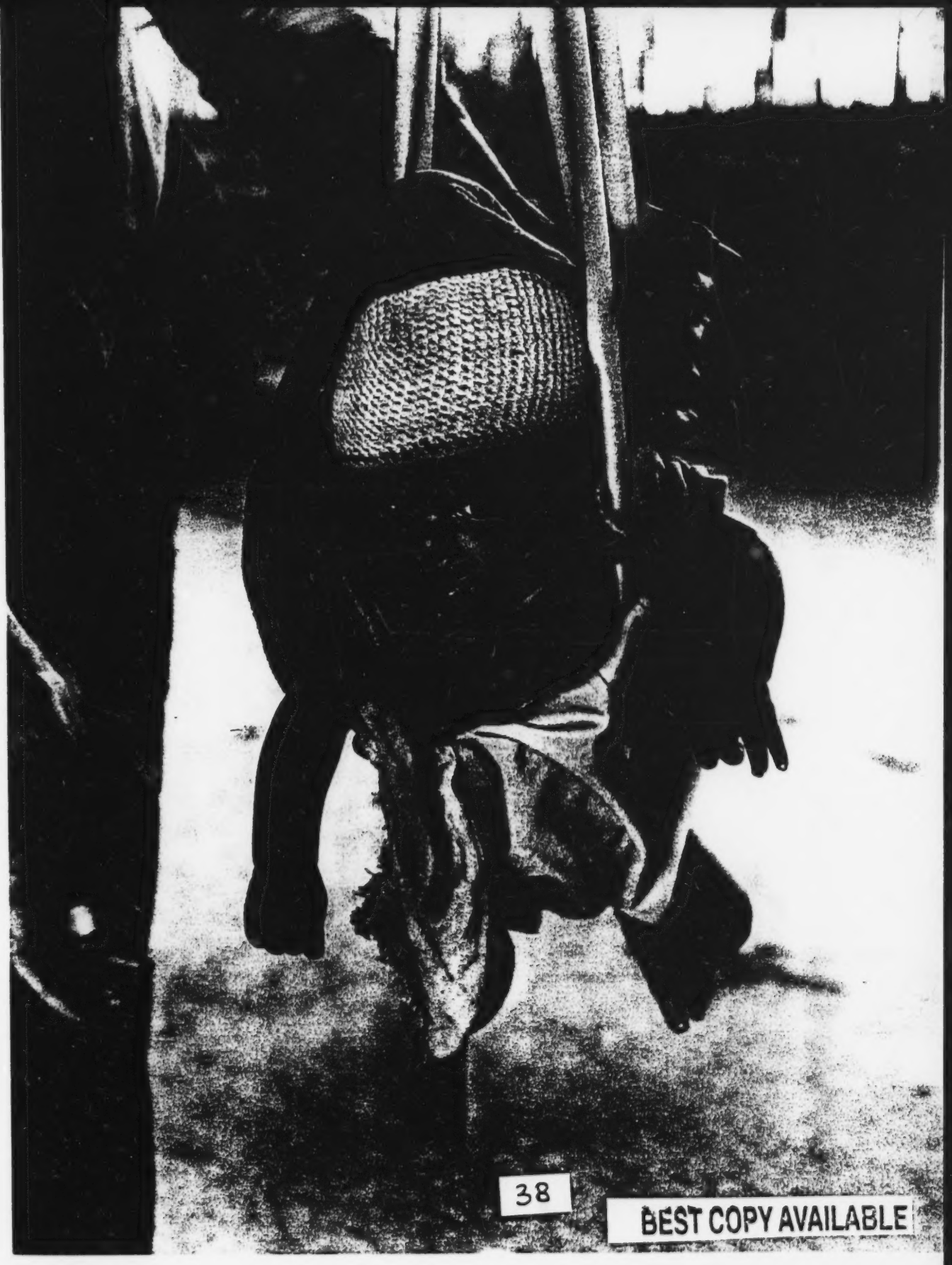
One potentially optimistic note in this dismal picture of declining aid flows and increasing debt is the new 'Heavily Indebted Poor Countries (HIPC) Debt Initiative' launched by the World Bank and the International Monetary Fund in 1996. This initiative is designed to assist poor countries to achieve sustainable levels of debt based on an established track record of implementing social and economic reform and on the condition additional resources are channelled to basic social services. Bolivia, Burkina Faso and Uganda will benefit from the initiative only in April 1998 or later. More generous and timely debt-relief would enable these counties and others that will hopefully soon qualify to release resources to reduce malnutrition.

If the basic causes of malnutrition are to be addressed, greater and better targeted resources and improved collaboration, participation and dialogue are needed. Awareness and information must be generated: between sections of national governments; between governments; with all development partners, donors, UN agencies, non-governmental organizations (NGOs) and investors; and above all with those whose circumstances are rarely understood or noticed, the poor themselves.

Action against malnutrition is both imperative and possible. The world, as the next part of this report explains, has already accumulated a wealth of experience and insights on which progress can be built.

UNICEF/96-0572/Toutounji

Increased awareness and education about the causes of malnutrition are essential if the problem is to be successfully addressed. A health card in her hand, a woman holds her baby at a UNICEF-assisted health centre in Syria.



BEST COPY AVAILABLE

Approaches that work

To succeed, the fight against malnutrition must be waged on many fronts.

Actions as diverse as improving women's access to education, fortifying staple foods with essential nutrients, enhancing the spread of practical information and increasing government social-sector spending have all led to improved nutrition in a number of countries. The challenge is in devising overall strategies that address specific nutrition problems.

The range of factors necessary for nutrition improvement was explored in a recent study by the United Nations,[1] which confirmed that there is no one formula to follow but that certain elements are essential.

For example, the empowerment of women is of central importance to improving nutrition of both women themselves and their children. This includes legislative and political efforts to combat discrimination against and exploitation of women and measures to ensure that women have adequate access to resources and care at all levels of society. Improving education for girls and women is also vital.

Photo: Growth monitoring is a powerful tool to protect children's nutrition and to empower communities. A child is weighed at a health centre in Ethiopia.

UNICEF 5603/Thomas

The United Nations report had this is to say about the following specific factors involved in improving nutrition.

► ***Nutrition and economic growth:*** Most countries in which nutrition has improved over the last two decades also enjoyed relatively high rates of economic growth over a sustained period. Nonetheless, the relationship is not completely straightforward.

In countries where economic growth has resulted in increased household income and resource access for the poor, the nutritional payoff has been large. In Indonesia, for example, economic growth from 1976 to 1986 was accompanied by a 50 per cent rise in the income of the poorest 40 per cent of the people. Improvements in nutrition have been relatively constant throughout the economic boom, although they could have been even better.

Household food insecurity — one of the key underlying causes of malnutrition — is often the pivotal point in the relationship between economic growth and nutritional status. Poor households spend a large proportion of their income on food. While poor households do not always use income increases to raise their calorie consumption significantly, in many countries greater income has led to in-

The empowerment of women is of central importance to improving nutrition of both women themselves and their children.

Panel 8

UNICEF and the World Food Programme

The World Food Programme (WFP), the food aid organization of the United Nations system, began operations in 1963 and is now the largest such organization in the world. WFP responds to food needs associated with emergencies and development, often working with the other two Rome-based agencies, the Food and Agriculture Organization of the United Nations (FAO) and the International Fund for Agricultural Development (IFAD).

WFP provides three broad categories of food aid: emergency rations for victims of natural and man-made disasters (Food-For-Life); food aid distributed through health clinics, schools and other community centres to particularly vulnerable groups (Food-For-Growth); and food rations provided in exchange for work on development projects (Food-For-Work). In all three categories, much of WFP's work is linked to the priorities and efforts of UNICEF.

The link between the two sister agencies goes beyond organizational coordination. Their work is complementary, and they share common goals. Both recognize that children are at once the most vulnerable group in society — and yet the future of every community. Together, the two agencies have the tools to attack malnutrition, helping to ensure access to adequate nutrition, with food, health and care, and to fight with a unified voice for the elimination of hunger.

In crisis situations requiring Food-For-Life assistance, UNICEF and WFP collaborate to provide therapeutic and supplementary feeding to save the lives of young children during emergencies, as occurred in the recent past in the countries of former Yugoslavia. They also share logistics capacity, for example in Uganda, where WFP stored UNICEF's health kits and supplementary feeding supplies, subsequently transporting them to Rwanda during the sudden return of refugees in late 1996. And they cooperate in making joint assessments of the problem of inadequate nutrition and priority needs for addressing it, as in the case of the Democratic People's Republic of Korea, where a nutrition assessment was completed in September 1997. In southern Sudan, the two agencies, together with NGOs and counterparts, lead an annual needs assessment mission, which not only examines food security but also 'health security', based on nutritional status and access to health services.

UNICEF and WFP also work together on post-conflict projects, such as the demobilization of child soldiers. In Bukavu, in eastern Democratic Republic of the Congo, WFP provides food to a centre set up by UNICEF to help children who fought in the civil conflict reintegrate in society.

Food-For-Growth, the cornerstone of one of WFP's major priorities, is particularly close to the concerns of UNICEF. This type of food aid is designed to provide assistance to mothers and children and other vulnerable groups at critical times in their lives. In Zambia, UNICEF worked closely with WFP in 1994 to ensure that a food supplement, aimed at preventing malnutrition in young children during prolonged drought, was appropriately formulated and fortified. The high-energy protein supplement was used as part of a coordinated programme to provide both food and health care to children judged to be at particularly high risk of malnutrition.

In Madagascar, UNICEF and WFP work together to rehabilitate schools in the poorer regions of the south. UNICEF provides school kits and equipment, and WFP contributes school meals.

The two agencies also work together on Food-For-Work projects when such aid dovetails with UNICEF mandates. In Malawi, for example, following the introduction of free primary education in 1994, WFP and UNICEF later designed a school feeding programme with the aim of 'Keeping kids in school'. Mothers of schoolchildren are 'paid' a food allocation in exchange for the preparation of school meals.

creased consumption of higher-quality foods that tend to be rich in protein and micronutrients — the vitamins and minerals needed in very small but regular amounts to assure nutrition.

But while economic growth must be understood as a frequent contributor to nutrition improvement, it is not a necessary condition for it. A number of countries, such as the United Republic of Tanzania in the case described below, have achieved widespread nutrition improvement without significant overall economic growth.

► ***Nutrition and the status of women***: A major conclusion of the United Nations report is that in countries where nutrition improvement has lagged behind economic growth, social discrimination against women is common. In Pakistan, for example, widespread discrimination against girls and women is behind high levels of illiteracy among women and girls, a very high fertility rate and lower female life expectancy. Child malnutrition rates in Pakistan are among the highest in the world, as is the proportion of low-birthweight infants, at 25 per cent.

Some experts place the major blame for the very high child malnutrition and low birthweight throughout much of South Asia on such factors as women's poor access to education and low levels of employment, compared with other regions.

On the other hand, women in Thailand, where nutrition has improved remarkably in the last two decades, have very high literacy, high participation in the labour force, and a strong place in social and household-level decision-making.

► ***Nutrition and social-sector spending***: Investment in health, education, sanitation and other social sectors — especially with emphasis on access of women and girls to these services — is among the most important policy tools for improving nutrition.

As a child survival and development measure, UNICEF has championed the 20-20 Initiative — the allocation of at least 20 per cent of government spending to basic social services to be matched by 20 per cent of donor funding in these areas. The value of such investment is becoming increasingly apparent. For example, there is evidence from Sri Lanka and a number of other countries that increases in spending on public health services are more strongly associated with reduced infant mortality and better nutrition than are overall increases in income.

After Zimbabwe achieved independence in 1980, explicit policies were followed to redress the lack of access of many communities to basic services. As a result, there were vast improvements in health services and immunization, family planning and a range of educational services for the poor — all of them important determinants of the improvements in nutrition that the country has enjoyed.

The approaches described above are all essential — and driven by the right of children and women to adequate services and resources.

Actions that are more directed to nutrition improvement as a principal outcome — improving the quality of staple foods through fortification, improving local-level nutritional surveillance capacity, protecting women's right to breastfeed, sharing information on better complementary foods — may have a more rapid and focused effect on nutrition.

A number of these more direct approaches that have worked are described below.

WORLD FOOD SUMMIT

The World Food Summit, in which 186 countries participated, was organized by the Food and Agricultural Organization of the United Nations (FAO) in Rome in November 1996. The Summit was an important contribution in the effort to refocus international attention on the need to tackle the problems of both food insecurity and malnutrition. The Summit's Plan of Action focused on ways of achieving sustainable food security for all, one of the necessary conditions for good nutrition.

The Plan of Action called for an enabling social and economic environment to achieve food security and drew attention to the special contribution that women can make to ensuring family and child nutrition, the importance of breastfeeding and the particular importance of giving priority to children, especially girls. Other objectives related to the need to reduce inequality and poverty and the need for participatory and sustainable rural development policies and for trade policies conducive to the achievement of food security for all. A commitment was made to realize the rights of all to adequate food and to freedom from hunger.

Triple A takes hold in Oman

Over the last 27 years, Oman has made great strides in child survival and development. Child mortality dropped from 215 per 1,000 live births in 1970 to 25 in 1995. School enrolment, particularly among girls, has increased dramatically. Revenues from oil have provided an economic foundation—Oman's GNP per capita in 1995 was $4,820 — but these gains would not have been possible without the Government's commitment to improving people's lives.

Progress has been slower, however, in terms of child nutrition. The Ministry of Health, with support from UNICEF, has been working to address this challenge since 1993. To improve children's nutritional status, a community-based programme of growth monitoring, counselling and nutrition education was devised. A particular focus is 105 villages of Al Dakhiliya, an arid, rocky region in upper-central Oman where a 1995 survey found that nearly one third of the children under the age of five were underweight.

The results to date are impressive. Since the project's inception, there has been a significant drop in the number of underweight children, according to an appraisal in 1996. Later the same year another appraisal described the project as well focused, effectively managed and clearly building a momentum towards nationwide nutritional improvement. Motivation, commitment and participation were high among mothers and community volunteers. And women enjoy the opportunity the programme offers to meet together and find common ground in helping their children grow better.

The driving force of the programme is called 'triple A': three consecutive steps in a problem-solving cycle of **A**ssessing the problem, **A**nalysing its causes and initiating **A**ctions to improve children's nutrition. Triple A is an iterative process that repeats the cycle of reassessment, re-analysis and re-action, leading to regular modifications and improvements in the approaches taken.

True to this model, the people of the small villages and nomadic or semi-nomadic settlements of Al Dakhiliya were involved from the very start, attending meetings to identify the problems, discuss solutions and select from among themselves the volunteers who would be central to the effort.

Every month throughout the region, at public meetings or during visits to homes, these volunteers weigh children and chart their growth, referring severely underweight children to health care centres. They advise families on how to feed children and to improve caring practices, on how to keep children healthy and manage illness when it occurs and on how to space births. They also reinforce other public health activities, encouraging pregnant women to register early for antenatal care, for example, and helping in community immunization campaigns and national health days.

Regional trainers were brought in to teach the volunteers about the incidence and causes of malnutrition, and how to improve and support appropriate feeding and caring practices, using the triple A methodology to solve problems. A programme coordinator at the regional level links the communities with programme support structures at the national level and supervises, monitors and trains trainers. There are programme coordinators at the district level as well. Finally, back-up support for the volunteers is provided by teams of health staff from nearby health centres.

A nutritional monitoring system has also been created: At the monthly weighing sessions, the volunteers fill out forms for all children, recording their age and weight. The information on the nutritional status of all the children in a village goes on the form volunteers send every month to the district health supervisor, who then reports the status of the district's children to the regional coordinator.

The tangible change for families and children in Al Dakhiliya has been so positive that the programme is being expanded to additional villages in the region and has been introduced in another five regions of the country.

Photo: A woman reviews her child's growth chart with a volunteer nutrition adviser, part of a community-based effort to promote better child nutrition in Oman.

Dramatic results from small beginnings

In villages across Tanzania, a seemingly modest process began in the early 1980s when villagers, many of them in poor and remote areas, began to track the weight of their children. With financial support from the Government of Italy and day-to-day technical support from UNICEF, the Child Survival and Development (CSD) Programme began in five districts in the Iringa region, eventually reaching more than half the population of the country.

The result was the virtual disappearance of severe malnutrition — and striking reductions in mild and moderate malnutrition. The lives of thousands of children were saved. These improvements were accomplished against the backdrop of previously high mortality and malnutrition rates among young children that began to climb in Tanzania following the economic decline in the 1970s and 1980s. Of crucial importance was the Government's continued commitment, even during this difficult period, to policies worked out with the full participation of communities and families. This approach that was to prove one of the greatest strengths of the CSD Programme.

A community-wide picture

A major feature was community-based growth monitoring, which allowed the parents and other community members to assess the nutritional well-being of their own and other children in the village. The results could then be compared with figures for neighbouring villages and those throughout the country.

These assessments provided a baseline at the start of the programme and were repeated every three months thereafter to follow the progress of individual children. When the results for all the children in the village were added together, they provided a concrete measure of nutritional well-being and development for the whole community. These quarterly weighing sessions sparked the participation not only of fathers and mothers, but also of the whole community in analysing why children were malnourished and why some seemed to thrive while others did not.

An improved understanding of the factors involved in the nutritional well-being of their children in turn helped the villagers to plan and initiate actions that would contribute to better growth and overall child health.

Subsequent weighing sessions helped parents and villagers evaluate the results and effectiveness of the actions taken and consider new or modified actions. In this way, continuous cycles that combined assessment, analysis and action — the 'triple A' approach — were established, helping spark successive nutrition improvements in the programme villages (Fig. 8: Panels 9 and 10).

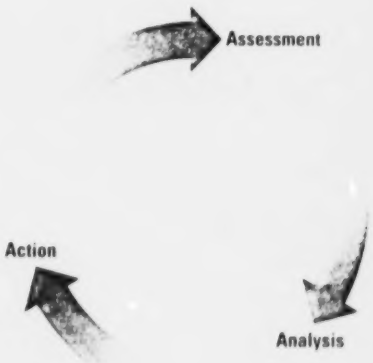
The steps the villagers took were aimed at increasing feeding frequency; encouraging better use of basic health services; training health workers, including skilled birth attendants and healers; improving the home treatment of diarrhoea and other illnesses; strengthening household technology to improve the porridge made for young children; reducing vitamin and mineral deficiencies; supporting activities such as small animal husbandry and home gardening; and improving sanitation.

From bystanders to participants

The simple tool of growth monitoring allowed the villagers to make better use of their own creativity and resources, to express their requests for

Fig. 8 Better nutrition through triple A

The 'triple A' cycle of Assessing a problem, Analysing its causes and taking Action based on this analysis can be used at all levels of society to create processes whereby people's right to good nutrition is fulfilled.



Source UNICEF, 1997

Celebrating gains in children's health in Brazil

E Mack

Residents of the Morro de Céu slum in Rio de Janeiro normally have little time for celebrations. But on a recent Saturday afternoon, 40 mothers, their children and community leaders affiliated with the Brazilian Child Pastorate gathered under the trees outside a parish hall. The community leaders set the children one by one on a scale, recording their weight in notebooks and consulting with the mothers on any nutrition or health problems. The weighing over, the occasion turned festive. Community leaders brought out trays of home-baked cakes and cookies; the yard filled with conversation and laughter and the happy shrieks of children at play.

The Child Pastorate's success in protecting the health and development of poor children in Brazil is definitely cause for celebration. The Pastorate estimates that in the communities where the programme is in place, the malnutrition rate among children under five does not exceed 8 per cent, compared to 16.3 per cent nationally as found in a 1996 Demographic and Health Survey applying the same criteria*. Additionally, the Child Pastorate estimates that the incidence of low birthweight babies is 6 per cent in communities it assists, while the incidence is 9.2 per cent nationally.

The Child Pastorate is one of the largest NGOs in the world devoted to child health, nutrition and development. Its aim is to empower the poor both to improve their children's lives and to participate in transforming their communities and their country.

The National Conference of Brazilian Bishops founded the NGO in 1983, with efforts beginning in one community in Paraná state. Now the Child Pastorate operates in 22,000 communities, in cities large and small, as well as in rural areas, and serves 2.1 million families, including over 3.1 million children under the age of six and nearly 144,000 pregnant women.

The Pastorate's nearly 83,000 community volunteers, mainly women, are the backbone of the programme, working directly with 10 to 20 families in their neighbourhoods. "They are like shepherds, looking after their communities," says Dr. Zilda Arns Neumann, a paediatrician and the national coordinator of the NGO since its inception. Community leaders are trained in basic child and maternal nutrition and health skills, including monitoring growth, tracking immunizations, supporting breastfeeding, treating diarrhoea with oral rehydration therapy (ORT) and preventing and detecting pneumonia.

The Pastorate makes nutrition a community issue: Families get help, encouragement and support from neighbours in improving their children's well-being. Community leaders visit the homes of children who are malnourished, monitoring their weight frequently and referring families to local health facilities if necessary. They screen pregnant women for indications of malnutrition and refer them to medical facilities for prenatal care and delivery, and after birth, support for breastfeeding is a main priority. Families also learn how to prepare nutritious meals with low-cost ingredients that are available locally. The Pastorate promotes child development through play and activities to improve speech and motor skills; its basic education programme serves 46,000 teenagers and adults.

The Child Pastorate's work is guided by a four-part methodology. The first three — 'see' (observe the situation), 'judge' (define the causes) and 'act' (take action based on the causes) — are similar to UNICEF's triple A approach. The fourth is 'celebrate' (rejoice in the gains made in children's nutrition and health).

The Child Pastorate uses its partnerships — with the Government at all levels, with other NGOs and with the media — to maximum effect, planning budget and activities to complement those of the Ministry of Health. It works through municipal councils to help maintain public services in communities, from the quality of tap water to health services to education.

The broadcast media are strong allies. Nutrition and health messages developed by the Child Pastorate are aired on a 15-minute radio programme, *Viva a Vida* (Enjoy Life), once or twice a week by 910 radio stations. Since 1995, the Child Pas-

* Percentage of children below the 10th percentile of the National Center for Health Statistics (US) reference weight-for-age standard.

torate has received about one quarter of the proceeds of the annual fund-raising television campaign 'Criança Esperança' (Child Hope), sponsored by UNICEF and Globo TV, to assist municipalities with high infant mortality rates throughout the country. The Pastorate estimates that in the campaign's first year, malnutrition declined by 14 per cent in the municipalities featured on the programme.

The Child Pastorate is able to operate at low cost, in part because of the considerable efforts of its volunteers and the logistical net provided by the Catholic Church. Training, transportation and other support for the programme's community leaders are among the main expenses. The Child Pastorate received assistance from UNICEF in its early years. Since 1987, the Brazilian Ministry of Health has provided support, with additional funds raised from the private sector.

Photo: In Brazil, Child Pastorate volunteers weigh a young girl during a growth monitoring session.

external support more clearly and to become less dependent on such support.

One thing the Tanzanian CSD Programme did not do was increase the production or availability of basic food. While food is obviously essential for good nutrition, the success of the Tanzanian approach suggested that an overall lack of food at the household level was *not* the major cause of malnutrition in young children and pregnant women in the villages. Less tangible, but singularly important, was the transformation that many communities underwent. From passively enduring economic decline and marginalization, villagers became active participants for change, formulating and carrying out policies that led to better lives for their children and themselves. A major feature of this transformation was the emergence of women as central players, making decisions at both the community and household levels, with local support in the form of start-up financing for their income-generating activities.

Two other factors underpinned the success of the programme: universal education, including adult education, and a high level of political mobilization in Tanzanian villages that provided an organized system of communication.

Despite setbacks, durable progress

The Tanzanian experience was hardly perfect. When decisions are made through a repetitive, collective process, false starts and mistakes are inevitable. Gains also have been difficult to sustain in some areas. But durable progress has been made: Communities have actively taken up the fight against malnutrition, and they have collected and analysed information themselves. The sense of power and commitment gained through such a process is not quickly relinquished.

UNICEF/97-0277/Noorani

When women are respected and manage resources in a community, their own and their children's nutritional status improves. Women in Bangladesh gain experience through their own small businesses.

Panel 11

Rewriting Elias's story in Mbeya

Gilles Vauclair

My name is Elias. I am two-and-a-half years old and I live on the outskirts of Mbeya with my mother, father, two older brothers and an older sister.

We are poor and our house has no toilet. My mother gets up early to fetch water from the river since our house has no tap. Then she goes to her farm plot, leaving me with my sister, Sophia, who is seven. Sophia collects firewood and does other chores for my mother, so she doesn't have much time to spend with me.

When my mother returns from her plot, she cooks a meal, usually maize porridge. Last year my mother grew enough maize, but this year she had to sell some to get money to buy other things. Now she says she doesn't know what we will eat when our maize stock runs out.

When I was younger, my mother breastfed me. Since she stopped, I have often been ill with fevers and diarrhoea. When I last had a fever, the nurse at the dispensary said it was probably malaria. My mother bought medicine but I didn't get better. Now I feel very ill and I don't have much energy.

— From a drama staged by HANDS' community organizers

Elias's story is a cautionary tale of how poor sanitation, the cessation of breastfeeding, disease and poverty converge all too often in malnutrition or even death for young children. The Health and Nutrition District Support (HANDS) project is helping people in Mbeya, a large urban centre in south-west Tanzania, rewrite this tale with a healthier, happier ending for their children. Launched by the Tanzanian Government in 1992 with support from the United Kingdom Overseas Development Administration, HANDS' success has been impressive.

Moderate malnutrition in children fell to 22 per cent in 1995 from 33 per cent in 1992, and severe malnutrition dropped to 0.4 per cent from 3.3 per cent in areas where HANDS operates. In contrast, malnutrition increased by 7 percentage points among children under five in Mbeya as a whole.

In the same period, in HANDS' areas, the percentage of pregnant women with anaemia declined from 37 per cent to 33 per cent, and the incidence of low birthweight was also reduced. Ninety-nine per cent of children between the ages of one and five were fully vaccinated, up from 86 per cent. The proportion of households with access to safe water increased from 60 to 96 per cent, and those with pit latrines from 75 to 92 per cent. In all, about 125,000 people benefited directly and indirectly.

An important strategy of HANDS lies in careful targeting: The project focuses on areas with the highest levels of child malnutrition and infectious diseases, lowest levels of domestic sanitation and most limited access to health facilities. Equally important, the community has been intimately involved, from planning through implementation and management, with evaluation. The poor identified their priorities and became partners with government staff in implementing a range of health-enhancing development activities.

Donor support has been critical in providing training, essential equipment and transport. An investment was also made in council and community development funds, enabling the council to improve health services and access to safe water, upgrade sanitation and promote household hygiene in targeted areas.

Revitalized maternal and child health services in the community now are responsible for child vaccination, antenatal and post-natal care, family planning, diarrhoeal disease

control, treatments for common childhood illnesses and growth promotion activities. Health and nutrition education activities are stronger and focus on children's vulnerability during the period when complementary foods are being introduced, on the nutritional needs of pregnant women and on home-based oral rehydration therapy. Outreach services now support households with malnourished children, and community-based day-care centres have improved the well-being of young children.

Four new water schemes serve over 50,000 people, and three health centres were upgraded, now reaching 80,000 people. Affordable latrines and basic hygiene are promoted, and innovative work is being done on low-cost public toilets.

Thanks to seminars, formal training and drama sessions run by Tanzanian women lawyers, the rights of women and children are higher on the public agenda. A subsequent survey found that fathers are making greater contributions to child welfare.

The HANDS project is now in a second phase: Tanzanians have replaced international staff, and project management lies with local council committees. The commitment and participation of local government staff and community members indicate that the project is sustainable.

Photo: As one way to improve child nutrition and maternal health, the HANDS project has brought safe water and sanitation to thousands of people. Women and their children in Tanzania

About 10 years after the first successes in Iringa were reported, a comparable approach is now achieving very similar results in Mbeya, another part of Tanzania (Panel 11). Virtually the same community-based approach that had proven successful in Iringa and elsewhere in Tanzania was introduced in Mbeya. The improvement in the nutritional status of children there, again carefully monitored and documented, independently confirms the validity of this approach.

Nor is the community learning approach used in Tanzania by any means unique. In the heart of the Sahel, villagers in the Maradi region of Niger, with support from UNICEF and bilateral donors, have also begun to record their children's weight on a regular basis. These villagers face many obstacles that communities in Tanzania did not have — little rainfall and a very short growing season, much less experience with participatory development, less support from the central level and a history of village-level decision-making that explicitly excluded women. But malnutrition has been significantly reduced, and the scale of their activities seems on track to rival that of Tanzania (Panel 12).

In Thailand, another success story

On the other side of the globe, Thailand has achieved stunning improvements in the nutrition of millions of its children through a combination of approaches, aided by a booming economy. The Thai Government estimates that malnutrition of under-five children fell from about 51 per cent in 1982 (measured as a proportion of underweight children) to about 19 per cent in 1990, and that severe malnutrition virtually disappeared during that period. At the local level, growth

Thailand has achieved stunning improvements in the nutrition of millions of its children through a combination of approaches, aided by a booming economy.

Panel 12

Women in Niger take the lead against malnutrition

UNICEF/HQ-1959/Pirozzi

Better seeds and fertilizer, a diesel-powered mill and two donkey carts: With these modest improvements, women in Kwaren Tsabre, a village in central Niger, are lessening their workloads and beginning to overcome the widespread malnutrition threatening their children.

The problems seemed intractable just a few years ago. Over half the young children in the village of 680 inhabitants were underweight, and many showed signs of serious vitamin A deficiency—which can lead to blindness and death.

Progress is being made thanks to a close partnership between the community and district-based government agents, founded on the people's own assessment and analysis of their situation. The problems were acute: As in many villages in the heart of the Sahel region in West Africa, Kwaren Tsabre experienced chronic shortages of staple foods; diets lacked richness and diversity; women were grossly overworked and had little access to education and information; and health services were remote and often of poor quality.

Because women were most seriously and directly affected, it was necessary to put them at the centre of decision-making and have them benefit from the new initiatives. A women's group — the Village Women's Committee — was formed, with members trained by government agents in the district. The first step, as Zouera, the first President of the Committee, explained, was to identify actions that could bring about measurable improvements in nutrition.

"We realized that because our workdays were so long — between 14 and 17 hours — we couldn't care for our children as well as we wanted to," she said. Getting a loan for a diesel mill to relieve the women of the arduous task of hand-pounding sorghum and millet was one response. Another was to purchase two donkey carts to reduce the hours spent carrying wood and water. Both mill and carts save time and generate income: The villagers of Kwaren Tsabre and their neighbours from miles around agreed to pay modest fees to grind grain and use the carts.

With technical help, better irrigation and improved seeds and fertilizer, staple crop yields have nearly tripled and new vitamin A-rich foods are also being produced, including amaranth and baobab leaves. The women incorporated these vitamin A sources and small amounts of oil into their usual meals and soon began noticing a decrease in night-blindness (a symptom of vitamin A deficiency) among their children. Women in neighbouring villages have reported that night-blindness has also been reduced among pregnant women.

Zouera and her colleagues in the Committee also decided, in consultation with government technical staff, to set up a cooperative cereal bank. This bank purchases and stores grain safely after the harvest and gives poor families a place to buy grain at reasonable prices during pre-harvest seasons, when they cannot afford the market price.

In a short time, the cereal bank paid for itself and even turned a profit. "With this money we're subsidizing other activities, such as the distribution of peanut butter as a complementary food for very young children who are still breastfeeding," Zouera said. The Committee also gives a small cash bonus to the women who supervise the regular growth monitoring of children. The monitoring enables women to see for themselves what is happening with their children, and they can use

the information to analyse and act on problems in their own homes and community.

Children's malnutrition rates in Kwaren Tsabre have fallen by 10 percentage points in a short time between 1995 and 1996. And this is only the beginning. Poor-quality and inaccessible health services are still a problem and an impediment to further gains against malnutrition.

But the women of Kwaren Tsabre now know that they have the tools and a process for addressing even that difficult problem with the help of their partners. Multiply the achievements of Kwaren Tsabre by the 326 villages across the Maradi Province of Niger into which this programme has spread, and one begins to see victory emerging in the age-old battle against child malnutrition.

Photo: Long hours spent carrying water and fuel and other arduous work drastically reduce women's time to care for their children. Cooperative efforts help reduce the burden. Members of an agricultural cooperative in Niger build a terrace to prevent soil erosion.

monitoring and promotion (GMP) coverage increased nationwide from about 1 million children to about 2.6 million.

GMP was combined with supplementary feeding activities in some locations. In addition to this increased attention to nutrition, a number of policy and programme measures contributed to reducing malnutrition and poverty. Targeted to poorer regions, these included: school lunch programmes; surveillance of 'basic minimum needs' indicators; village-level planning to ensure that priority needs were met; rural job creation; and support for small-scale food producers. Community participation, in varying degrees, was part of all Thai programmes.

There is general recognition that more needs to be done in Thailand, but these remarkable gains are a solid foundation for the future.

Protecting, promoting and supporting breastfeeding

Virtually all of the community-based programmes that have resulted in reductions in malnutrition have focused on improvements in infant feeding, especially the protection, promotion and support of breastfeeding.

While community-based support for breastfeeding is a major achievement, even the efforts of communities well aware of the central importance of breastfeeding can be foiled by larger economic and institutional pressures.

The blitz of inappropriate advertising and promotion by manufacturers of breastmilk substitutes — mostly infant formula — has been a central challenge in the fight to protect and promote breastfeeding. While infant formula is an important product for the minority of children who for some

UNICEF/5770/Sprague

Keeping babies close to their mothers is fundamental in a baby-friendly hospital. A mother and child in Brazil 'room in'.

reason are not, or cannot be, breastfed, sales and promotional activities around it have sometimes been based on untrue claims of its value compared with that of breastmilk.

Promotional activities, such as providing free or subsidized supplies of infant formula, bottles and teats in maternity wards, have also undermined the best intentions and the confidence of new mothers to breastfeed.

In 1981, the World Health Assembly, which consists of the health ministers of almost all countries, responded vigorously to inappropriate promotional efforts of the infant-food industry by adopting the International Code of Marketing of Breastmilk Substitutes, drafted by WHO, UNICEF, NGOs and representatives of the infant food industry.[3]

The Code establishes minimum standards to regulate marketing practices by setting out the responsibilities of companies, health workers, governments and others and provides standards for the labelling of breastmilk substitutes. Among its provisions are that health facilities must never be involved in the promotion of breastmilk substitutes and that free samples should not be provided to pregnant women or new mothers.

Progress has been relatively slow in translating the Code's minimum provisions into national laws. As of September 1997, only 17 countries had approved laws that put them into full compliance with the Code. Training and development of model legislation are now accelerating action in this area. Support from the Government of Sweden has enabled UNICEF to provide greater technical assistance on Code implementation and other legal aspects of breastfeeding support.

A recent report, *Cracking the Code*, by the Interagency Group on Breastfeeding Monitoring, based in the United Kingdom, highlights the work that remains to be done. It documents widespread violations of the Code by multinational companies in four countries: Bangladesh, Poland, South Africa and Thailand.

The Baby-Friendly Hospital Initiative

As a complement to community-based efforts to protect, promote and support breastfeeding and to promulgate the Code, UNICEF and WHO in 1991 began an intensive effort to transform practices in maternity hospitals.

The Baby-Friendly Hospital Initiative (BFHI), as the effort is called, brought a structured programme to breastfeeding support and, in just six years, has helped transform over 12,700 hospitals in 114 countries into centres of support for good infant feeding. These baby-friendly hospitals are havens of protection for breastfeeding, where women and children are not subject to advertising and promotional activities for infant formula or feeding bottles, and where they can receive effective and well-informed help for a sound start to breastfeeding.

BFHI has a simple but thorough approach. Through a WHO-UNICEF training programme that has been translated into the official languages of the United Nations and into many others, the professional staffs of maternity hospitals are trained in lactation management and support. Staff members, along with the directors or managers of their health facility, make a commitment to fulfil the initiative's 'Ten steps to successful breastfeeding' (see sidebar). These include pledging to ensure that women and newborns can remain together all the time and that women must be free to begin breastfeeding promptly after birth and to continue exclusive breastfeeding on demand during their hospital stay.

Step 10 calls for setting up breastfeeding support groups that new mothers

can rely on. Hospitals can be awarded 'baby-friendly' status only when specially trained independent evaluators have ensured that all 10 steps are met.

It is hard to overestimate the success of BFHI. More than a million people are working to implement its programme, and the overall pace of hospital certifications has not slowed. Patterns of declining breastfeeding, particularly in urban areas, have been reversed in country after country following BFHI implementation (Panel 13).

The success of the initiative can also be measured in the health of young children. In Panama, the Ministry of Health reported a 58 per cent reduction in respiratory infections and a 15 per cent decline in diarrhoea in infants in just one year in a single baby-friendly facility, the Amador Guerrero Hospital. In north-eastern Brazil, Acari Hospital credits BFHI with dramatic cost savings from decreased hospitalization of infants and reduced case fatality among them. In the first two years of BFHI implementation at the Central Hospital of Libreville in Gabon, it was estimated that there was a 15 per cent reduction in cases of neonatal diarrhoea, a 14 per cent reduction in dehydration and an 8 per cent reduction in mortality.

❑ Successes outside the developing world

BFHI is not just for non-industrialized countries.

An evaluation in the Republic of Moldova, once part of the former Soviet Union near the Romanian border, showed an average reduction in all neonatal infections in four baby-friendly hospitals from about 18 per cent to 7.5 per cent in two years of the programme. The neonatal infection rate in the hospital that had been certified as baby-friendly the longest dropped from 23 per cent to 3.4 per cent. Rates of breastfeeding initiation in the country rose appreciably, and rates of continued breastfeeding at 6 and 12 months were significantly higher over the period of implementation of the programme.

Similar results are being reported from Asia and Latin America, and some countries are in the process of conducting extensive evaluations of BFHI's impact. In the United States, there is an active BFHI programme, and 11 hospitals have been declared baby-friendly.

BFHI was conceived by a small group of experts with vision and leadership and was tested, modified and then introduced globally. But it could not have succeeded without the engagement of local institutions and communities. Local NGOs have played a significant role in the promotion and sustenance of BFHI in many countries. And an international NGO, the World Alliance for Breastfeeding Action (WABA), founded in 1991, has helped solidify actions in support of the initiative and breastfeeding beyond the hospital through its work in networking, information sharing and advocacy.

National breastfeeding committees, though often established prior to BFHI, were energized by the initiative's concrete achievements. Paediatric and obstetric professional associations have endorsed the programme and have been educated by it.

BFHI has also helped establish breastfeeding firmly on the political agenda. The challenge for the future is to use the political energy behind BFHI to ensure that breastfeeding promotion and support extend beyond hospital walls and that breastfeeding support groups become a constant priority for communities and governments.

❑ Complementing breastfeeding

Good infant feeding includes not only support for breastfeeding but also en-

TEN STEPS TO SUCCESSFUL BREASTFEEDING

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within a half-hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated.
7. Practise rooming-in — allow mothers and infants to remain together — 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

In addition, facilities should refuse to accept free and low-cost supplies of breastmilk substitutes, feeding bottles and teats.

— From *Protecting, Promoting and Supporting Breastfeeding: The special role of maternity services. A Joint WHO/UNICEF Statement* (WHO, 1989) and 'The Global Criteria for the WHO/UNICEF Baby-Friendly Hospital Initiative' (UNICEF, 1992)

BFHI: Breastfeeding breakthroughs

UNICEF/93-1718/Lemoyne

Smiling at her infant in her arms, Elba Diaz awaits Juanito's six-month check-up at a primary health care centre in southern Santiago. Her third child draws nothing but compliments from health workers, unlike Ms. Diaz's first two children, who were not so healthy. The difference is that Juanito — born at the Barros Luco Hospital, one of 19 baby-friendly hospitals in Chile — is the only child she has been able to breastfeed exclusively.

"Immediately after Juanito was born," recalls Ms. Diaz, "he was laid on my body. Words can't describe how blissful I was, feeling his warmth and looking at his flushed face so close to me. I began nursing him at the breast while we were still in the delivery room, and he was beside me always, receiving only my breastmilk."

In Chile, breastfeeding support and counselling for mothers have led to enormous health benefits for tens of thousands of children like Juanito in little more than a decade. In 1985, only 4 per cent of infants were exclusively breastfed for the first six months of their lives. Remarkably, only a year after the Baby-Friendly Hospital Initiative (BFHI) was launched in 1991, a study of 9,200 infants nationwide showed that the rate had risen to 25 per cent. And preliminary results of a national survey in 1996 suggest that the exclusive breastfeeding rate for the first six months is now about 40 per cent.

What lies behind this transformation? Training is an important part of the answer. With support from the NGO Wellstart International and UNICEF, training materials were adapted, and in just four years over 7,500 health workers learned to help women breastfeed effectively. Strong support from the Ministry of Health was another factor, and UNICEF provided sustained advocacy. The National Breastfeeding Commission, organized in 1992, has also kept breastfeeding high on Chile's child health agenda.

Another effective measure was expanding 'baby-friendly' practices into primary health care centres, where trained staff offer breastfeeding education and support. "The staff acquainted me with breastfeeding during my pregnancy," said one mother. "The first week after delivery, I joined a group session at the clinic to share my concerns with other breastfeeding mothers. I feel very secure, having easy access to professional advice on any breastfeeding questions."

These achievements in Chile have been replicated across the world through BFHI and related efforts. In Cuba, only about 63 per cent of newborns were breastfed exclusively at the time they left the hospital in 1990. Now, six years after BFHI was introduced, an estimated 98 per cent of newborns are exclusively breastfed when they leave the maternity ward. And more strikingly, about 72 per cent of those infants are exclusively breastfed through four months of age, up from 25 per cent in 1990. All 44 hospitals handling over 1,000 deliveries a year and 42 per cent of smaller hospitals in the country are baby-friendly. In 1996, Cuba extended the baby-friendly programme to the community level by putting it into practice at small community health centres attended by family doctors.

On the other side of the globe, China had over 6,300 baby-friendly hospitals at the end of 1996. Thanks to BFHI and some regulation of the marketing of breastmilk substitutes, 48 per cent of infants in urban areas and 68 per cent in rural areas are now exclusively breastfed for four

months, a 1994 survey found. Just two years earlier, the rates were 10 and 29 per cent respectively. Considering that about 20 million infants are born each year in China, this represents a remarkable accomplishment.

Iran, which began promoting breastfeeding in the 1980s, has held training workshops for over 30,000 health professionals each year between 1991 and 1996 after BFHI was introduced. The national support has led to a leap in the exclusive breastfeeding rate from 10 to 53 per cent in that period. An added windfall is the more than $50 million that the country saves annually, as infant formula imports dropped by 75 per cent from 48 million tins in 1991 to 12 million in 1996.

Because of the many benefits of breastfeeding since BFHI started, it is impossible to calculate the lives saved and those made better — though they certainly number in the millions. It is difficult to imagine any other way in which these results could have been achieved so effectively and in such a short time. Baby-friendly hospitals have surely made the world a friendlier place for babies and their families.

Photo: A woman breastfeeds her newborn at a hospital in China. BFHI has increased breastfeeding rates significantly in the country.

suring good complementary feeding practices for children more than six months old whose nutritional needs can no longer be fully met by breastfeeding, though sustained breastfeeding well into the second year of life remains important (Panel 14).

The CSD Programme in Tanzania brought about a number of significant improvements in household-level preparation of good-quality complementary foods, including porridges with reduced viscosity designed to increase consumption by young children.

Until recently, however, there has not been good scientific consensus on a number of questions related to the additional food needs of older breastfed children. WHO and UNICEF recently brought together a group of internationally renowned scientists and programme practitioners familiar with these problems, and a consensus report will soon be published that will offer technical guidance for improving complementary feeding.

Targeting specific nutritional deficiencies

In assessing nutrition problems and implementing programmes to attack them, it is not possible to separate protein-energy malnutrition from vitamin and mineral deficiencies. Integrated community-based programmes that have achieved reductions in overall malnutrition have usually done so by addressing both micronutrient and protein-energy deficiencies. But among the kinds of malnutrition identified at the 1990 World Summit for Children, progress has been more rapid in reducing some deficiencies than others.

Grains of salt: Reducing iodine deficiency disorders

The reduction in iodine deficiency, the world's leading cause of preventable mental retardation, is a global

The reduction in iodine deficiency, the world's leading cause of preventable mental retardation, is a global success story by any standard.

Panel 14

Tackling malnutrition in Bangladesh

UNICEF-97-0294/Noorani

A new project in Bangladesh is helping to reduce malnutrition among children and mothers by improving caring practices, supporting breastfeeding and empowering women and their communities.

Some 56 per cent of Bangladeshi children under five suffer from moderate and severe malnutrition, 21 per cent of whom are severely underweight, and studies show that more than 70 per cent of pregnant and breastfeeding women are also malnourished. Protein-energy malnutrition is the main problem but, as often happens, it occurs together with such conditions as iron deficiency anaemia and vitamin A deficiency. In Bangladesh, lack of food is not the main cause of malnutrition; the lack of proper caring practices for children and pregnant women is an important contributing factor.

Recognizing that malnutrition is hindering national development, the Government has formulated a National Nutrition Policy and launched a nationwide nutrition intervention programme, the Bangladesh Integrated Nutrition Project. The initiative aims to address malnutrition directly and help promote faster socio-economic development.

Community nutrition promoters are the backbone of the project. Earning about $12 a month, they are trained for two months, including one month on the job. They learn how to understand the causes and signs of malnutrition and techniques for its treatment and prevention. They canvass their communities, persuading mothers to bring their children to the Community Nutrition Centres for monthly weighing and growth monitoring, and explaining the importance of child care, including children's needs for exclusive breastfeeding in the first six months; the need for smaller, more frequent and nutritious meals up to age three; and for extra feeding during and after illnesses to prevent malnutrition.

Marium Begum, one of the nutrition promoters, has already started to achieve results in her village. During growth monitoring sessions at her Community Nutrition Centre, situated in one of the homes in her village, Ms. Begum could see that Shewli, a one-year-old girl, was suffering from severe malnutrition. Ms. Begum explained to Shewli's mother, Shamsun, how to give her daughter a special locally made diet supplement. She also helped Shamsun to understand that she had been unable to breastfeed because she had not been eating enough herself. Following local tradition, Shamsun was accustomed to eating last, after serving food to her family, and there was often little food left. Ms. Begum explained how to re-lactate — that is, to resume lactation after it has stopped for some time — and arranged for intensive counselling at the Community Nutrition Centre.

Improving the nutrition of adolescent girls and pregnant and lactating women is another priority of the project. The nutrition promoters urge women to use iodized salt in their households to prevent iodine deficiency disorders, and to use oral rehydration therapy when a child has diarrhoea to prevent dehydration. They discuss the use of vitamin A and iron supplementation.

Special diet supplements are provided to malnourished women and children. Village Women's Groups, comprising up to 11 volunteers in each community, buy ingredients for the supplement — a carefully weighed mixture of rice, lentils, molasses and oil — at local markets to prepare and package them. Each member of the group earns about $10 per month

through the sale of packets to the nutrition centres.

The Ministry of Health and Family Welfare, with the assistance of the Bangladesh Rural Advancement Committee (BRAC), has established nearly 1,000 Community Nutrition Centres in people's homes, each operating six days a week. The centres cover 65,000 children and 16,000 pregnant and lactating women. By the year 2001, the goal is to have 8,000 community nutrition promoters reaching 100,000 pregnant or lactating women and 500,000 children under the age of two.

In the case of Shamsun, her diet has improved with the guidance and encouragement of Marium Begum. She was able to breastfeed her daughter, complementing the breastmilk with normal family food and the special dietary supplement. And instead of selling the eggs her six hens lay, she feeds them to her family. Shewli, although still small and thin, has resumed healthy growth.

Photo: Better caring practices, including improved personal hygiene, are essential to reducing malnutrition. In Bangladesh, a nutrition promoter helps women who are about to feed their children to wash their hands.

success story by any standard. This achievement, which began to show significant results beginning in 1992, involved a coordinated international effort to change diets in a subtle but important way — an approach that has had an impact on probably more people worldwide than any previous nutrition initiative.

A diet deficient in iodine exerts its saddest and most significant effect on the developing embryo, starting at around 12 weeks after conception. Inadequate iodine results in insufficient thyroid hormone, which in turn leads to a failure of normal growth of the brain and nervous system. The result is all too often a child born with a lifetime disability.

The practice of using iodized salt as a safe, cheap and effective way to combat iodine deficiency disorders (IDD) had a long track record by 1992. It was introduced in Switzerland in 1922, in the United States in 1924, and in the Andean countries of South America in the 1950s and 1960s.

Among the goals adopted at the World Summit for Children, the virtual elimination of IDD was regarded by UNICEF as one of the most achievable. Universal salt iodization — all salt destined for both human and animal consumption — was the obvious strategy to advance the attack on IDD.

Getting the job done, a continuing effort, is a process that uses the 'triple A' approach — assessment, analysis and action — on a global scale.

In some countries, the problem of iodine deficiency was known, but rigorous assessments — using such indicators as goitre prevalence and urinary iodine excretion — were needed to convince policy makers and salt producers of the need for action. The next step was to analyse these results, along with the workings of commercial salt networks and the organi-

UNICEF/83-0479/O'Connor

Rapid gains in salt iodization worldwide demonstrate the effectiveness of public- and private-sector cooperation in combating nutritional deficiencies. In Bolivia, a man seals a packet of iodized salt.

UNICEF estimates that nearly 60 per cent of all edible salt in the world is now iodized, and among countries in the world with recognized IDD problems, all but seven have passed appropriate legislation to ensure universal iodization.

zation of the salt industry. Using advocacy and attention to legal detail, it was also necessary to pass appropriate legislation to ensure correct levels of salt iodization, and to protect iodized salt producers by eliminating non-iodized salt from the market.

Actually getting iodine into salt supplies was another matter. The task was addressed in ways that ranged from relatively easy adaptations by resource-rich major industrial salt producers that supply whole countries, to providing support for small producers to enable them to iodize salt without loss of income. Quality control and evaluation of the impact of salt iodization remain continuing challenges. Thanks to support from many quarters, all of these steps have been realized in a short time in an extraordinary number of countries. UNICEF estimates that nearly 60 per cent of all edible salt in the world is now iodized, and among countries in the world with recognized IDD problems, all but seven have passed appropriate legislation to ensure universal iodization.

Of the countries that had IDD problems in 1990, 26 now iodize over 90 per cent of their edible salt or import that proportion if they are not salt producers. Another 14 countries iodize between 75 per cent and 90 per cent of their salt. As late as 1994, 48 countries with established IDD problems had no programmes at all. Of these, 14 now iodize more than half their salt (Fig. 9).

At the level of children and their families, these results, though still incomplete, are improving lives by the thousands. It is estimated that up until 1990, about 40 million children were born each year at some risk of mental impairment due to iodine deficiency in their mothers' diets. By 1997, that figure was probably closer to 28 million[1] — still too many, but representing a clear and rapid decrease.

The number of children born each year with cretinism is difficult to estimate, but in 1990 it was on the order of 120,000. It is probably about half that now.

It is impossible to measure the impact of IDD on miscarriages, which are rarely well reported in health statistics, but the improvements are surely noticeable by affected women and their families. In highly iodine-deficient areas, infant mortality was long known to be elevated, but recent research now indicates that increasing the iodine intake of young infants to adequate levels may improve their survival to a far greater degree than previously expected, probably through improvements in their immune systems.

The gains in salt iodization came about largely because of the work of an alliance of responsive and knowledgeable partners. WHO, in collaboration with UNICEF and the International Council for the Control of Iodine Deficiency Disorders (ICCIDD), not only helped raise awareness of the importance of IDD but also worked to ensure scientific consensus and information on standards for: levels of salt iodization, the safety of iodized salt in pregnancy, and indicators for monitoring and evaluation. UNICEF, WHO and ICCIDD also provided technical and financial support for many steps of the process.

Kiwanis International, a global service organization, provides funding support and continues to educate its grass-roots membership about IDD (Panel 15).

The Government of Canada was a major player in all stages of this work, supporting UNICEF programmes in many countries and supporting the Ottawa-based Micronutrient Initiative, which in turn has extended technical support and funding to field programmes, including the development of monitoring guidelines. In

Fig. 9 Iodine deficiency disorders and salt iodization

Iodine deficiency disorders (IDD) were still a major public health problem in many parts of the world in 1990. Today, programmes to produce or import iodized salt are in place in most developing countries.

Global prevalence of IDD (circa 1990)

IDD is a public health problem | IDD is not a public health problem | No data | Countries not assisted by UNICEF

Percentage of households consuming iodized salt (1992–1996)

Less than 50% | 50% to 89% | 90% or more | No data | Countries not assisted by UNICEF

Source: IDD data from UNICEF, 'Report on Progress Towards Universal Salt Iodization', 1994. Salt iodization data compiled by UNICEF, 1997.
Note: The boundaries shown on this map do not imply official endorsement or acceptance by UNICEF. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan.

BEST COPY AVAILABLE

Panel 15

Kiwanis mobilize to end iodine deficiency's deadly toll

UNICEF/95-0134/Charton

Hundreds of times during the past several years, the Reverend Bob Wildman, a retired Protestant pastor, has ambled into Kiwanis International Club meetings all over Illinois and eastern Iowa in the Midwestern United States. Usually, he is granted only a few minutes to win over some very tough audiences.

Many of the men and women who make up these Kiwanis clubs are business executives and professionals who have supported the organization's service projects helping children and others in need in their own communities. The 73-year-old Rev. Wildman, a veteran Kiwanis leader, is determined to expand their notion of neighbourhood to include the global village.

He has added his preacher's voice to the Kiwanians' first international service project: the campaign to wipe out one of the world's most devastating nutritional problems — iodine deficiency disorders (IDD). Kiwanis leaders have brought to this global effort the fund-raising muscle of their 600,000 members in 83 countries.

An estimated 28 million babies are born each year at risk of mental impairment due to insufficient iodine in their mothers' diets. Hundreds of thousands of children and adults suffer the most debilitating effect of iodine deficiency: a condition known as cretinism.

Rev. Wildman's challenge has been to make club members in his area care about villagers in remote regions of Africa, Asia and Latin America. In many developing countries, lack of iodine has taken a horrendous toll on children — from physical deformities to mental retardation. Iodization of table salt — a method of fortification now taken for granted in industrialized nations and costing less than 5 cents per person per year — can rid the world of this tragedy.

Before he speaks, Rev. Wildman places on the podium a poster-sized copy of a cherished photo of a tiny boy named Abdul Alim — whom he met in a 1994 visit to a village in Bangladesh. Abdul is an eight-year-old in a four-year-old's deformed and malfunctioning body. He is profoundly mentally retarded and deaf and is held by a young man from the village because he cannot walk.

Rev. Wildman describes Abdul's disabilities and the severe hardships his care places on a village economy. The picture of this small child bridges geographical and cultural divides, and soon his audiences are ready to climb on the IDD campaign bandwagon.

When Kiwanis International joined the campaign against IDD in 1994, they pledged to raise $75 million by July 1998. Since then, they have become a key part of the campaign, with over $20 million raised or pledged so far for programmes in over 50 countries through Kiwanians' efforts. UNICEF estimates that this contribution has saved around 3 million children from irreversible mental retardation.

Kiwanis leaders like Rev. Wildman have been shrinking the distance between their home towns and places like Abdul Alim's tiny village in Bangladesh, and the concept of thinking globally while acting locally is taking hold in creative ways around the world.

The Kiwanis Club of Ried im Innkreis in Austria staged a performance of the Chinese Dance and Acrobats Ensemble, for example, raising $9,000 for the IDD campaign. Kiwanians in Atikokan in Ontario (Canada) brought in the Jolly Ukranians, a folk group, netting the campaign $2,000. Kiwanis Clubs in the Philippines are supporting the campaign in their own country, where iodine deficiency is still a threat, through community education pro-

jects and the distribution of iodized salt.

Kiwanians in the Netherlands have pledged to raise $600,000 through the sale of salt pots and a photo essay book. Hong Kong Kiwanians took in $10,000 for the campaign by obtaining sponsorships for completing a rugged 60-mile hike. The Kiwanis Club of Bergerac (France) donated proceeds from a masked ball, while Kiwanians in Christchurch (New Zealand) raised $1,300 with a bowling tournament. The Kiwanis Club of Spanish Town (Jamaica) convinced a local salt factory to iodize salt, sponsored IDD education events and set up an IDD prevention billboard on a major highway.

The 95-member Kiwanis chapter in Rockford, Illinois, Rev. Wildman's home town, has managed to more than double its original goal of $30,000 through fundraising efforts large and small. When Kathleen Sullivan was recently installed as the chapter's new president at a dinner banquet, instead of buying expensive flower arrangements for each table, Ms. Sullivan decided on home-made centrepieces anchored with boxes of salt. "The money saved went to the IDD campaign," says Ms. Sullivan, "and when I was making these centrepieces with my daughters, I explained what IDD was doing to children just like them. I like to believe they have a better view of the world because of the campaign."

Photo: Checking for signs of iodine deficiency, a nurse examines the thyroid gland of a woman at a UNICEF-assisted health centre in Myanmar.

1995, UNICEF estimated that over 7 million children were born free of the mental impairments of IDD largely because of the Canadian contribution.

Partly because of Canada's early and unambiguous support to combating IDD, other donors and governments in affected countries were drawn into the battle. The approximately $20 million invested by the Government of Canada catalysed other investors. Total investment by public- and private-sector partners in this effort since 1986 is now estimated to exceed $1 billion.[4]

In country after country, advocacy for salt iodization legislation has brought together teachers, consumer groups, women's groups and health professionals. Primary schoolchildren by the millions are armed with test kits that enable them to check whether the salt in their homes is iodized — and to get a valuable chemistry lesson in the process. In Indonesia, for example, the enormous challenge of salt iodization in a country of almost 14 thousand islands, with highly decentralized salt production, is being overcome by a coalition that includes millions of the country's schoolchildren and teachers.

The elimination of IDD as a public health problem is, of course, not complete, and momentum must not be lost. But the effort has already had results beyond these tangible benefits in the lives of individuals.

The fight against IDD has brought to the attention of policy makers and communities the importance of good nutrition in ensuring the physical and mental development of children and populations. It has opened the door to accelerated work on other nutrient deficiencies with public health significance. It has demonstrated the value of public- and private-sector partnerships in pursuit of a well-defined goal in favour of children.

UNICEF/96-0886/Clausen

A drop of testing solution added to a pinch of salt indicates whether iodine is present.

UNICEF/94-0730/Booker

At a day-care centre in Viet Nam, babies eat vitamin A-rich vegetables grown in community gardens.

The success of the drive for universal iodization of salt shows that the diets of children, women and families worldwide can be changed in small but very beneficial ways in just a few years as a result of concerted global, national and local action. It is imperative that this experience be built upon in attacking some of the other nutritional deficiencies that can begin impairing the development of a child even before birth.

Capitalizing on vitamin A's benefits

Although the value of vitamin A for protecting children against blindness has been known for decades, vitamin A's amazing ability to strengthen resistance to infection and reduce the chances of children dying has only recently won general acceptance by the scientific and medical establishment.

Following a dramatic report from Indonesia in 1986 of a 34 per cent reduction in pre-school child mortality with vitamin A,[5] seven additional large studies were carried out over the next seven years. Most of these studies, involving more than 160,000 African and Asian children, reported large and significant reductions in mortality when children were given additional vitamin A through supplements or fortified food products. When these results were combined statistically in 1993, it was firmly established that vitamin A supplementation could reduce child mortality by about 23 per cent where there is a risk of deficiency.[6] These conclusions, strengthened further by evidence that the vitamin has an even greater life-saving effect on children with measles, brought widespread acceptance that measures to prevent vitamin A deficiency could have an enormous impact on child survival.

Adequate vitamin A status does little to prevent children from being infected but has a major effect on reducing the severity of illness, especially persistent diarrhoea, dysentery, measles and malaria (Panel 18). Vitamin A's power to reduce the severity of illness was clearly evident in Ghana, where periodic distribution of the vitamin led to a reduction in local clinic attendance by 12 per cent and hospital admissions by 38 per cent.[7] Vitamin A can thus have a double-barrelled effect: It not only reduces the severity of illness and saves lives but also may ease the demand on often overworked health workers and facilities.

The effect of the discovery of vitamin A as a child survival tool led to renewed global interest in updating knowledge about the extent and public health significance of vitamin A and other micronutrient deficiencies. Numerous surveys of clinical and subclinical vitamin A deficiency have led to an estimate that in 1990 there were over 100 million young children in the world at risk from the deficiency because of inadequate diets, although today the immediate risk for many of these children has been diminished by effective interventions, including regular vitamin A supplements.

Some countries still lack good assessments, but vitamin A deficiency, its underlying causes and its consequences for health and survival are much better understood now than ever before.

The age-old condition of maternal night-blindness has finally come to be recognized as a major public health problem. Long ignored by both afflicted women and the medical establishment, maternal night-blindness is now recognized to be widespread, with an estimated 1 million to 2 million pregnant women affected at any given time in South Asia alone. Women describe how they are able to see adequately during the day but after sunset are unable to move about

and carry out their household chores. They consider it a common problem of pregnancy that goes away once the child is born. But recent work in Nepal shows that women with night-blindness during pregnancy are six times more likely to have been night blind in a previous pregnancy[4] and that the condition is a marker for a constellation of risk factors, including dietary vitamin A inadequacy and deficiency; iron deficiency anaemia; protein-energy malnutrition; increased morbidity during pregnancy; and mortality up to two years after diagnosis (Panel 1).

Combining a variety of approaches

Several approaches exist to prevent vitamin A deficiency, each with its own strengths and limitations, but which can be highly effective if applied in complementary ways. These include vitamin A supplements (commonly administered in capsule form), fortification of food and gardening or other methods to improve diets.

Vitamin A can be boosted through homestead gardening or adapting food preservation or preparation methods that can enhance retention. And fortifying food with vitamin A has become increasingly feasible as fortifiable foods penetrate the markets of the poor in a number of countries. These food-based approaches combine increased vitamin A supply with nutrition education that promotes the consumption of vitamin A-rich foods by young children and women.

Periodic supplementation that provides high-dose vitamin A capsules — both to children from 6 months to 5 years and beyond, and to mothers as soon after childbirth as possible — has proved to be a very valuable intervention, offering immediate help to children who are at risk of vitamin A deficiency in situations where food-based options are limited. Experts estimate that periodic high-dose supplements for young children have the potential of eliminating 90 per cent of blindness and other ocular consequences of vitamin A deficiency and about 23 per cent of mortality in early childhood wherever the deficiency is common.

Successes in supplementation

It is a major global achievement that by mid-1997, some 30 years after the first vitamin A supplementation programmes began in India, the policy of providing children with periodic high-dose supplements has been adopted in all but 3 of the 38 countries where clinical vitamin A deficiency still existed, and in all but 13 of the additional 40 countries with documented subclinical deficiency.

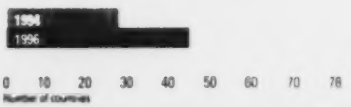
At least 35 countries also routinely provide vitamin A supplements with immunizations during 'national immunization days'. And many countries link vitamin A supplementation to regular immunization activities or to periodic deworming of children, as in India and Mauritania.

Overall, UNICEF estimates that more than half of all young children in countries where vitamin A deficiency is known to be common received high-dose vitamin A capsules in 1996, compared to about one third in 1994 (Fig. 10). This includes such large countries as Bangladesh, India, Nigeria and Viet Nam. Between 1993 and 1996, UNICEF purchased nearly a half-billion high-dose vitamin A capsules that were distributed in 136 countries, helping to bring or keep vitamin A deficiency under control. At roughly 2 cents per capsule and perhaps 20 to 25 cents per delivered dose, few other child health or nutrition interventions are as cost-

Fig. 10 Progress in vitamin A supplementation programmes

In the 78 countries where vitamin A deficiency is a recognized public health problem, supplementation programmes are on the rise

Countries where policies to supplement post-partum mothers are in place



Countries where young children routinely receive vitamin A supplements

Countries where more than 50% of young children routinely receive vitamin A supplements

Source: UNICEF/MI/Tulane University, 'Progress in controlling vitamin A deficiency 1997' (draft)

Iron deficiency anaemia is probably the most prevalent nutritional problem in the world...and progress in reducing its prevalence and impact has been slower than might be hoped.

effective in reducing mortality and disability throughout life as vitamin A supplements.

Breastmilk nearly always provides enough vitamin A to protect a child from severe deficiency, even if this means that the child's mother becomes deficient. However, both mothers and infants can be protected against deficiency if mothers receive a high dose of vitamin A soon after they give birth. Some 50 countries have adopted a policy of routine high-dose supplements for women soon after childbirth, which protects their children for about six months. New information on the impact of vitamin A deficiency on women's health makes post-partum supplementation an even greater priority (Panel 1).

Sugar fortification: A sweet success

Several countries have chosen another route to improved vitamin A status of their populations: fortifying the sugar supply.

Guatemala has led the developing world in fortifying sugar with vitamin A since the mid-1970s. Despite nearly a decade of civil disturbance and a lapse in fortification for several years in the early 1980s, an evaluation of 82 villages in 1990 concluded that sugar fortification had brought vitamin A deficiency under control among Guatemalan children.

Sugar is also being fortified in parts of Bolivia, Brazil, El Salvador, Honduras and the Philippines, and Zambia is planning to begin fortification in 1998, with other countries likely to follow or to find other staple foods to fortify with vitamin A. The Philippines, for example, has successfully tested and fortified a local, non-refrigerated margarine with vitamin A and is testing the impact of fortifying the wheat flour used in its national bread, *pan de sal*.

The success of fortification depends on a number of factors: Those at risk of the deficiency must consume the fortified food regularly and in great enough quantities to make a difference, the fortification must not alter the palatability of the product for consumers and it must not put the product out of their financial reach. If these conditions are met, this can be a very effective approach, as the Guatemalan experience has shown. Supplementation may be an important complementary strategy for fortification if fortified foods do not reach all affected individuals.

Countries also need to ensure that sugar fortification programmes do not promote increased consumption of sugar but are aimed at informing consumers that whatever sugar they do consume should be fortified.

Improving diets to boost vitamin A

In many countries, vegetable gardening around the home and food preservation and preparation methods that enhance the vitamin content of the diet have been promoted as a means of improving vitamin A intake. In West Africa and Haiti, for instance, drying of mangoes has extended access to this important vitamin A source beyond the months of the mango season.

In Bangladesh, home gardens of fruits and vegetables have been adopted by families of low socio-economic status in one fifth of the country in recent years, the result of systematic introduction of village nurseries, the availability of low-cost seeds, and reliable extension services. This work has been supported by the NGO Helen Keller International. Initial evaluations suggest that this programme has curbed the incidence of night-blindness, especially in families that grow and consume a variety of vegetables. This is one of relatively

few such projects where careful evaluations have made it possible to assess the impact of activities on vitamin A status.

There is evidence that eating a variety of foods rich in carotene — the precursor form of vitamin A found in fruits and vegetables — coupled with some vitamin A from animal sources — can alleviate moderate to severe vitamin A deficiency in children and women.

The absence of more evidence that gardening projects improve vitamin A status may be because of the low availability of some carotenoids in plant foods for the body, the lack of complementary fats and animal foods in the diet, or inadequate evaluation methods. In addition, it is not clear which vegetables or fruits are most effective in improving vitamin A status. This question is an important research challenge.

Promoting increased consumption of vitamin A through animal foods may be possible in some countries. A recent project in Central Java (Indonesia), supported by Helen Keller International, the Micronutrient Initiative and UNICEF, promoted the consumption of eggs, which are affordable, to reduce vitamin A deficiency. As a result, egg consumption increased and vitamin A status improved significantly among young children in this project (Panel 16). Helen Keller International also successfully promoted increased consumption of vitamin A-rich liver by children in Niger, where animal products are relatively accessible in some regions.

❑ Responding to anaemia

Iron deficiency anaemia is probably the most prevalent nutritional problem in the world. Over half the women in developing countries and a large percentage of young children suffer from it,[9] and progress in reducing its prevalence and impact has been slower than might be hoped. As with vitamin A, several approaches have been pursued.

The consequences of anaemia for pregnant women and their newborn children are often disastrous. The condition puts women at higher risk of death because of the greater likelihood of haemorrhage in childbirth and other factors, and their newborns face a high risk of poor growth and development. Many countries have adopted policies to ensure that women who seek prenatal care have access to daily iron supplements to help them meet the very high needs of pregnancy and childbirth. UNICEF is a major supplier of iron/folate tablets. A total of 2.7 billion were provided to 122 countries from 1993 to 1996.

However, since many pregnant women enter pregnancy already anaemic — and it is difficult to resolve pre-existing anaemia during pregnancy — more attention is being paid in some countries to improving the iron and folate status of girls and young women before their first pregnancy. There is evidence from small-scale trials that in cases where it is difficult to reach young women with daily iron/folate supplements, ensuring weekly or twice-weekly supplementation may still be effective in building iron stores.[10] In Malaysia, weekly supplementation over several months resolved the anaemia in over 80 per cent of adolescent girls in a community where anaemia was highly prevalent. Similar results have been reported from other countries.

Fortification of foods with iron is also an effective means of addressing anaemia. Wheat flour and flour products are the most common vehicles for iron fortification in places where they are widely consumed and centrally processed, particularly in Latin America and the Middle East (Panel 17).

UNICEF/WCA98/Pirozzi

Vitamin A supplementation reduces the severity of illness and the risk of death in children in areas where the vitamin is deficient, resulting in dramatic increases in child survival. In Mali, a girl holds a mango, a good source of vitamin A.

Panel 16

Indonesia makes strides against vitamin A deficiency

UNICEF/91-4645/Watson

One of the great — and still evolving — nutritional success stories is the progress made by Indonesia towards eliminating vitamin A deficiency. Two decades ago, in this nation of islands with a population of 200 million — the fourth highest in the world — the problem was serious. High levels of vitamin A deficiency, which can cause blindness and damage the immune system, greatly increasing the risk of illness and death, affected more than 2 million Indonesians.

The Government, in cooperation with UNICEF and other international partners, tackled the problem through the distribution of high-dose vitamin A capsules to children ages one to five, reducing deficiency levels dramatically. The rate of severe vitamin A deficiency has declined by more than 75 per cent, according to a national survey in 1993, sparing the eyes, health and lives of millions of children. Blindness among children due to vitamin A deficiency was eliminated in 1994.

Indonesia has not fully solved the vitamin A problem, however. Severe deficiency remains a problem in three provinces, and the survey also found that approximately half of all children under five had inadequate levels of vitamin A. Studies among schoolchildren and breastfeeding women in West Java have shown mild and moderate deficiency to be prevalent.

In response, the Indonesian Government has set the goal of eliminating vitamin A deficiency by the year 2000, using four strategies. The first is continued distribution of vitamin A capsules to children ages one to five through *posyandu* (community health posts), an effort which reached 60-70 per cent of children in this age group in 1993-1994. The second strategy is distribution of high-potency vitamin A capsules to mothers after they give birth, which will require special efforts, as only 35 per cent of births occur under medical supervision. The other strategies are food fortification with vitamins and minerals, including vitamin A (which is already under way by noodle manufacturers), and promotion of increased consumption of foods rich in the vitamin.

In support of this effort, the Government, with assistance from Helen Keller International, the Micronutrient Initiative and UNICEF, has launched the Central Java Project to improve vitamin A intake among children in this region in the first two years of life.

The project undertook three major efforts beginning in 1996, with the Indonesian system of *posyandu* and its cadre of midwives and birth attendants at the centre. First, a supplementation programme was launched to give one high-potency vitamin A capsule to all new mothers during the first month after delivery, along with two doses of deworming pills, to improve their health and nutrition. Ensuring mothers' adequate intake of vitamin A also ensures that babies receive the amount they need through breastfeeding.

In the first six months of the project, nearly 20 per cent of new mothers in Central Java received vitamin A capsules, almost double the rate in the previous two years. The goal of the project is to reach at least 80 per cent coverage.

A second element of the project is a large-scale social marketing campaign to promote consumption of foods rich in vitamin A, focusing on eggs and dark green leafy vegetables. Research found, for example, that while a number of vitamin A-rich foods — such as eggs, liver, spinach, cassava leaves and papaya — are available year-round, few mothers or community leaders recognized these

BEST COPY AVAILABLE

as good sources of vitamin A. Therefore a series of radio and television spots, posters, banners, advertising and one-on-one counselling methods were developed to publicize the benefits — for pregnant and breastfeeding women and for children between the ages of 6 and 24 months in particular — of eating eggs and vitamin A-rich foods.

Third, a nutritional surveillance system was instituted to provide information on nutritional status, food consumption patterns and updates on the effectiveness of the project.

Thus far, the project clearly has improved the understanding of nutrition and diet patterns in Central Java. Within three months of the start of the social marketing campaign, egg consumption by both children and mothers had increased, correlated with higher vitamin A levels.

Vitamin A capsules will continue to be an important measure because people's diets are still not sufficiently high in the vitamin. But the project has demonstrated that enriching diets through eggs, an available and rich source of vitamin A, is an important and sustainable step towards ensuring that mothers and children receive the vitamin A that they need to help them live and grow.

Photo: A health and nutrition worker in Indonesia explains the benefits of eggs, a good source of vitamin A

In 1993, Venezuela began fortifying all wheat and maize flour with iron and B vitamins. A 1996 evaluation showed large reductions in the prevalence of anaemia in children and adolescents following the fortification, even though during this period the country was suffering from a general economic decline.[11]

At a meeting in 1996, countries of the Middle East and North Africa made a joint commitment to fortifying wheat flour with iron as a principal strategy for anaemia reduction in the region, where wheat is a staple.

Anaemia is made worse by some illnesses, particularly hookworm infection. Malaria is also a major cause of anaemia, although this is not directly related to iron losses. In several countries, deworming of schoolchildren has been shown to reduce the prevalence and severity of anaemia.[12] Preventing malaria and improving its curative treatment, which are priorities of UNICEF and WHO for 1998 and beyond, will undoubtedly go a long way to reducing anaemia in children and adults alike.

Improving basic health services

The nutritional well-being of children around the world has benefited greatly from the enormous achievements since 1990 in improving children's access to basic health services, both curative and preventive.

The success of child immunization programmes has been a major boost to child health. Immunization also protects vitamin A levels, which plummet during acute measles infections. So, the spectacular achievement of over 90 per cent immunization coverage in 89 countries and over 80 per cent in another 40 countries by 1996 — including a 79 per cent global measles immunization rate[13] — means that for millions of children, vitamin A levels

The nutritional well-being of children around the world has benefited greatly from the enormous achievements since 1990 in improving children's access to basic health services, both curative and preventive.

Panel 17

Making food enrichment programmes sustainable

UNICEF/96-0060/Clausen

Fortification of food staples with iron, vitamin A, iodine and other micronutrients is the most cost-effective, sustainable option for eliminating micronutrient deficiencies. Salt iodization, reaching an additional 1.5 billion consumers worldwide since 1990 and sparing millions of babies from mental retardation each year, is testimony to how successful fortification programmes can be.

But as positive as the end results are, fortification is a complex undertaking that requires government and industry to commit to working together as partners. Recent experience shows that fortification succeeds when producers are involved from the start in formulating regulations and in resolving the marketing and technical issues that can make or break a programme.

It's the law: Effective legislation is a basic requirement, helping to set goals and define roles of food producers, the health and nutrition authorities and scientific institutions. Without such a framework, a programme is more vulnerable to weak implementation, uneven results and possible failure. That was the experience of South Africa, where a maize-enrichment programme launched in 1983 without compulsory legislation was pronounced a failure after 10 years. Efforts are now being made to review the programme, with a focus on legislation and the role of the food industry.

Even then, legislation must be enforced and supported by policies. Guatemala passed a law in 1975 mandating that sugar be fortified with vitamin A. Not only was the law unenforced but the programme also quickly fell apart for lack of the foreign exchange needed to purchase the vitamin and because producers were not convinced of the programme's effectiveness. A decade passed before fortification was resumed, after the Institute of Nutrition of Central America and Panama (INCAP) and UNICEF worked with producers to explain the importance of fortification, provided technical assistance and helped them obtain vitamin A at below-market prices or through donation. Guatemala's Ministry of Health now enforces the law: Producers whose sugar shows low levels of vitamin A in random tests are first warned and then are either fined or shut down.

Pricing and marketing: Start-up costs of equipment and training can be high, but these are primarily one-off. Costs of the fortificant, labour and equipment maintenance are recurrent. Fortifiers' competitive position in the market place can be further eroded by price controls or taxation, and governments can play a helpful role in these areas. When Brazil's Government removed price controls and reduced a value-added tax on milk, for example, dairy production received a boost and fortification of milk became more attractive to producers.

Laws can eliminate the price advantage enjoyed by non-fortified products. In 1997, Oman banned local production and importation of white wheat flour not fortified with iron and folate, and Bolivia mandated that all wheat — local, imported or donated — be fortified with iron, folic acid and vitamin B complex.

Yet government intervention does not always succeed in lowering costs to workable levels. In Indonesia, efforts to fortify monosodium glutamate (MSG) with vitamin A were unsuccessful because technical problems of maintaining vitamin stability and colour consistency were too costly to solve. In the Philippines, it was so expensive to develop fortified margarine that only one multinational corporation carried through with it.

Questions of quality: Fortification can have commercial consequences, since any change in the way a product tastes, looks or smells can hurt sales and market share. For example, when Venezuela in the late 1980s de-

cided to fortify maize flour with ferrous fumarate (iron), in product tests the flour turned from its familiar white to grey. Sensing that consumers would not buy the product, producers baulked. The situation was resolved in 1992, when the National Institute of Nutrition allowed producers to fortify with a blend of iron components that did not change the colour of the flour.

Follow-up: It is vital to keep tabs on the process to ensure that fortified products maintain potency standards and reach consumers. Chile began fortifying wheat flour with iron in the early 1950s, but it was not until 1967 that a system for monitoring and quality control was established, and only in 1975, when a national survey revealed the iron status of the population, that the programme's efficacy from that point on could begin to be evaluated.

Commitment and coordination: "Authorities must be convinced of the need to make fortification compulsory. And to eliminate any possible resistance, producers must be convinced of fortification's benefits," says Jorge David, head of the Latin American Millers Association (ALIM).

In 1996, Bolivia became the first country certified to have virtually eliminated iodine deficiency as a public health problem. The phenomenal success stems from legislation that expressed a public policy decision to iodize and 13 years of coordinated work by salt producers, the Government and international cooperation agencies.

Photo: In Ghana, workers gather salt to be taken to a processing plant for iodization

undisturbed by measles episodes will continue to help protect them from illness.

Programmes to improve hygiene and sanitation are also likely to be of crucial importance almost everywhere there is malnutrition in impoverished communities. Improved water supplies or support to food production may also be very critical, depending on local circumstances. Analyses in several countries have found that the strongest predicting factors for malnutrition are lack of safe water, inadequate sanitation and high fertility rates.

Each year over 1 million more children are saved from death through the use of oral rehydration therapy (ORT).[14] ORT promotion includes support for continued feeding during and after diarrhoea as well as the use of oral rehydration salts (ORS) to prevent and treat dehydration. Continued progress is needed in diarrhoea prevention, treatment, nutritional management and cure to ensure that growth lost during diarrhoea episodes is rapidly caught up, but the achievements so far have been of great nutritional benefit to millions of children. Similarly, the gains already achieved in access to safe water and sanitation facilities have translated into nutritional benefits around the world. Millions more children than before have been able to avoid plunging deeper into the spiral of infection and poor dietary intake because so many illness episodes are prevented or readily cured.

An especially important advance in the health world has been the revitalization of basic health services through such measures as the Bamako Initiative, the set of policy measures launched by African governments in 1987 in response to the rapid deterioration of public health systems in Africa in the 1970s and 1980s. Now operating in other regions, the Bamako Initiative measures have meant that

UNICEF/96-1079/Toutounji

Diarrhoea, often in conjunction with malnutrition, claims the lives of 2.2 million children each year. Increased use of ORT as well as improvements in hygiene and sanitation are helping stem the toll. In Syria, a woman gives her baby oral rehydration solution.

There is no single, globally applicable solution to the overall problem, and there is no substitute for assessment and analysis done with the full and active participation of the families most threatened by nutritional problems and most familiar with their impact and causes.

health centres in remote areas — virtually abandoned in the 1980s for lack of basic drugs and supplies — are again thriving and serving the communities whose active involvement in their management has helped resuscitate them. The results have been striking. In addition to ensuring access to basic curative services, the initiative has sustained increased coverage of immunization and other preventive activities. In Guinea, for example, prenatal care coverage went from less than 5 per cent before the initiative to almost 80 per cent in the mid-1990s.

With WHO and other partners, UNICEF is committed to accelerated action in malaria control, including the promotion of insecticide-treated bednets and support for improved drug use in malaria treatment. A combined programme for prevention of both iron deficiency anaemia — through iron supplementation, fortification and dietary improvement — and parasite-induced anaemia — through malaria control and deworming — is one emerging approach for effectively addressing these age-old problems.

Programmes featuring improved education and information

The programmes described above in Niger and Tanzania included important education, information and communication components. In some cases, this included reinforcing classroom education, as in Niger, where literacy and other non-formal instruction to women in participating villages only served to highlight the need to improve formal education for their children, especially their daughters. One donor agency involved in supporting community-based programmes in Niger, in fact, encouraged the inclusion of formal education for girls as part of the activities meant to improve nutrition.

School-based programmes in cases such as this, as well as non-formal programmes for youth and adults, such as literacy and parent education courses, are a useful complement and sometimes a principal vehicle for other activities promoting better nutrition. It is easy and usually very appropriate to ensure that curricula used in these programmes include strong nutrition components.

Schools, teachers and education programmes can serve as mobilizers of community participation in many ways, such as through village education committees and parent-teacher associations. These can also serve as a resource for nutrition and help organize relevant community-based assessment, analysis and action as well as promote good practices and share information concerning nutrition.

In the Lao People's Democratic Republic, for example, early childhood development volunteers in the community and parents are mobilized through participatory processes to develop, among other skills, better nutrition practices, both traditional and modern. The essential role of teachers and schoolchildren in promoting the use of iodized salt and even testing its quality in Indonesia was mentioned earlier. In this case, messages about salt iodization and its importance have even been formally incorporated into teacher training courses across the country.

Eight useful lessons

What have these success stories shown? While there is no single prescription, these eight points bear noting.

1. Solutions must involve those most directly affected.

Malnutrition has many causes and manifests itself in several ways. There is no single, globally applicable solu-

tion to the overall problem, and there is no substitute for assessment and analysis done with the full and active participation of the families most threatened by nutritional problems and most familiar with their impact and causes. People who suffer or whose children suffer from malnutrition cannot be passive recipients of programmes. If they are not the main players in problem assessment and analysis, then actions to reduce malnutrition are likely to be inappropriate or unsustainable.

2. A balance of approaches is necessary.

A central challenge for nutrition programmes, as well as other development efforts, is finding a balance of approaches that work. Processes involving assessment, analysis and action — the triple A approach — are essential for formulating appropriate 'bottom-up' solutions, particularly with respect to the ways in which programmes are organized, managed and monitored. But there are some aspects of resolving malnutrition that can be appropriately formulated at higher levels, using wide and more 'top-down' application of appropriate strategies and technologies, based on the best scientific knowledge and the most effective technologies available.

UNICEF experience indicates that for many problems, a combination of top-down and bottom-up actions may be best. BFHI was formulated as a global strategy, but its success has taken many forms, depending on the engagement of national and local institutions and groups.

Vitamin A supplementation was suggested by the mortality reduction it enabled in many places and endorsed globally as a strategy, but its application has depended greatly on existing health measures and the involvement of community-based institutions.

Salt iodization has been enhanced by consumer advocacy and legislative change at the local and national levels and by the fact that communities previously affected by IDD can see and feel a difference.

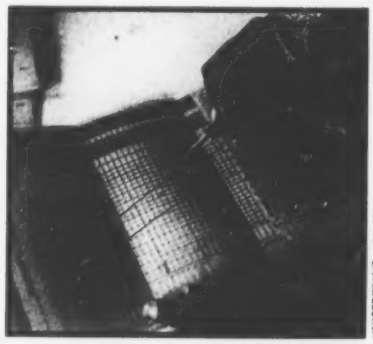
The essence of a triple A approach is not necessarily to establish new cycles but, as much as possible, to build upon existing ones. Assessment-analysis-action cycles are the logical steps everyone tries to follow in order to cope with their problems better. By understanding how nutritionally useful mechanisms work and where the weaknesses are, a nutrition programme can build upon and improve existing good practices, rather than establishing new systems and procedures that may be difficult to accept and adopt, and are therefore difficult to sustain.

In the case of the Tanzanian CSD Programme, there were many components but the main focus was to improve people's capacity to assess the problem — through growth monitoring — and thereby help them make better use of their resources.

3. Nutrition components work better in combination.

Because malnutrition is the result of so many factors, it is not surprising that it has been attacked most effectively in situations in which several sectors and strategies have been brought to bear.

Combining improved infant feeding, better household access to food overall and improved and more accessible health services and sanitation is clearly more effective in reducing malnutrition where food, health and care are a problem than any of these measures taken alone. In support of these various approaches that work, relevant social services — health, education, communication and social mobilization — must be more clearly focused on nutrition. This is not done



UNICEF/5748/Goodsmith

Community-based growth monitoring is a central component of the triple A approach. A child's growth chart is updated during a growth monitoring session in Mauritania.

UNICEF/93-0827/Isaac

Governments, communities and families need to work together to fulfil their children's rights to good nutrition. In Cambodia, a girl carries her baby sibling.

by creating new 'nutrition projects' in these areas, but rather by incorporating nutrition components in ongoing community-based activities. Experience shows the usefulness of building such nutrition components into all programmes, wherever possible.

The impact on nutrition of health, education and other social services should also be monitored, with the results used both for a better understanding of nutrition problems and as a means to motivate policy makers, programme staff and communities themselves to increase their efforts to reduce malnutrition. Based on the monitoring of nutrition impact, viable and successful programmes should be redesigned so as to have the best effect.

Communication plays a special role in nutrition programmes in arming parents, educators and other caregivers not only with basic nutrition information but also with the ability to make informed decisions and the skills and knowledge needed to take action to support improved nutrition in their communities.

Communication should be carried out simultaneously at various levels to include parents, other family members, teachers, volunteers and community leaders who can in turn teach and support good practices. In addition, personnel of provincial and district health offices, staff in agriculture, rural development and education itself, media representatives, researchers and persons in positions of power of any kind must be reached and their help enlisted.

4. Progress hinges on continuing research.

All of these gains against malnutrition have depended upon programmatically relevant research, but more is needed. Both motivated researchers and processes to support such research are needed. For example, it took the urging of United Nations agencies and financing from the Government of Canada to ensure an analysis of the mortality impact of vitamin A deficiency.

There is a need for more research to improve programmes that affect the hardest-to-reach people, and for determining the effectiveness of feasible interventions — for example, how to encourage increased consumption of green leafy vegetables. Research institutions, both industry-based and academic, need to include the poor and their day-to-day nutrition problems on the research agenda.

5. Food production is important but not enough.

As was demonstrated in the Tanzanian programmes of Iringa and Mbeya, nutrition can be improved even in rather poor communities without increasing overall food availability. Increasing food production is often necessary, but it is never enough to ensure improvement in nutrition.

Programmes that aim to increase food production countrywide or in parts of countries should not claim that nutrition will be improved in young children and women unless other specific and focused measures are implemented to better their situation.

6. Everyone has an obligation to child rights.

Children have a valid claim to good nutrition. The government has an obligation and many other members of society and the community, including parents, have duties to realize the child's right to good nutrition. All of these groups need to become aware of the nutrition problem, its causes and consequences, the possibilities of solutions, and their obligation to respect, protect, facilitate and fulfil child rights. They need to know what to do and how to do it. Advocacy, information, education and

BEST COPY AVAILABLE

training are all important strategies to create or increase this necessary awareness.

7. Community and family-based involvement is vital.

Children's rights give them valid claims on society. In order for poor people to carry out their duties towards children, the poor must be recognized as key actors rather than as passive beneficiaries.

All available resources, even those controlled outside the community, should be used to support processes within households and the community that contribute to improved nutrition. Such processes involve decisions about the use of resources and the monitoring of the impact of these decisions.

As described above, households and communities learn how to search for better solutions through the process of assessing the existing situation, analysing the causes and acting as available resources permit. Community-based monitoring is important in the repeated assessment of the evolving situation. Analyses by the community and by all supporters outside the community are facilitated by an improved understanding of the causes of the nutrition problem.

Outside support includes advocacy, information, education, training and direct service delivery. Government and NGO staff may work outside the community, but should be in frequent contact with the community, functioning as facilitators. They should focus their support and dialogue on community mobilizers: people who are a part of the community and enjoy its trust and respect.

There is no pre-defined package of inputs or services that can work. Instead, the community is constantly learning about the best mix of interventions, a mix that can change significantly over time. Community development means that desirable outcomes, such as good nutrition, are achieved through participatory and sustainable processes. A combination of top-down advocacy and mobilization and a bottom-up demand for support will ensure that both community and government feel ownership of successful changes.

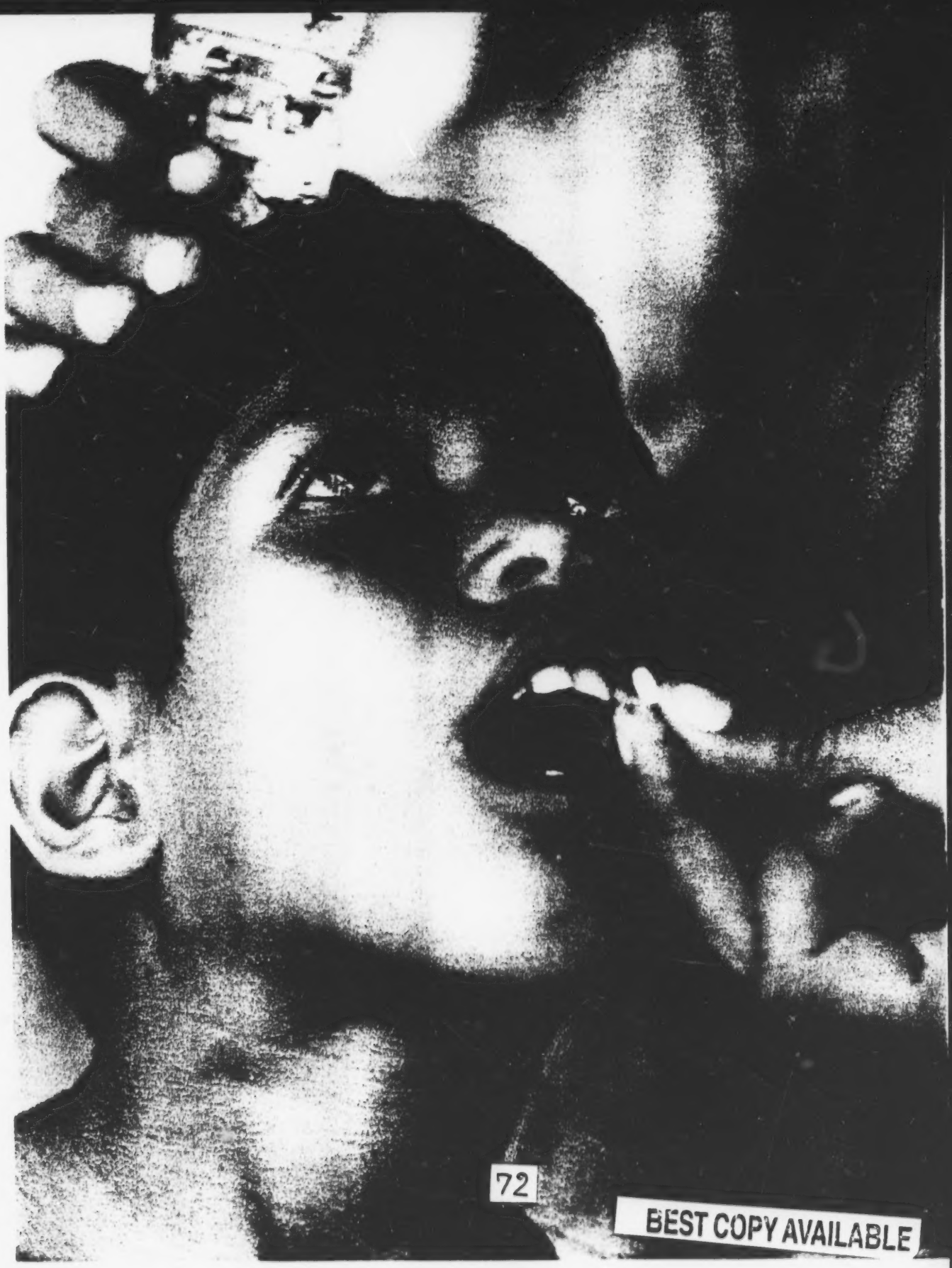
8. Government policies must reflect the right to nutrition.

Some national policies affect nutrition directly, such as salt iodization or immunization programmes, for example. Others, like income and price policies, affect nutrition indirectly.

With the ratification of the Convention on the Rights of the Child, governments have the obligation to respect, protect, facilitate and fulfil the rights enshrined in the Convention. All policies should therefore be analysed in terms of their real and potential impact on the right to good nutrition.

The most important strategies for nutrition include those for food, health, breastfeeding, education, and water and sanitation, and national nutrition information systems should be established to provide valid data about their impact. Policies should be based on knowledge from relevant research and be constantly evaluated for their real impact on nutrition in communities. Nutrition information systems should be as decentralized as the existing administrative systems, starting with community-based monitoring.

BEST COPY AVAILABLE



BEST COPY AVAILABLE

Bringing science to bear

Science and technology will never solve all of the problems associated with the inadequate food and care and the lack of health services and sanitation that lead to childhood malnutrition. But the successes stemming from breakthroughs being made and insights reached have stirred new hope for healthier, more productive lives for both children and adults. This section describes some of the crucial scientific advances that are helping to shape specific interventions to reduce malnutrition or that may do so in the future.

Some of this knowledge, such as the strengthening effect of vitamin A on the immune system, is well established; other knowledge is just emerging and is worth watching. Some of the new science is likely to accelerate efforts to reduce malnutrition, and at the same time generate new understanding of how reducing malnutrition in childhood or during the prenatal period may lessen chronic disease in adulthood and the onerous public health burden it causes. There are also new tools to tackle the essential task of nutritional assessment and new ways that agricultural science can be brought to bear on the problem.

Photo: Over a million pre-school-age children suffer from vitamin A deficiency, which affects immune-system functioning. Vitamin A supplementation is estimated to lower a child's risk of dying by 23 per cent. In Bangladesh, a boy receives a vitamin A capsule.

UNICEF/2064/Zaman

Nutritionally acquired immune deficiency

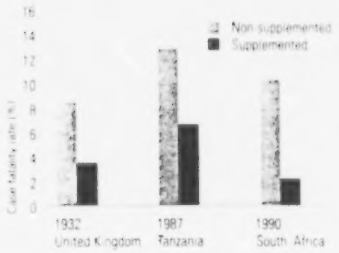
It is estimated that the immune systems of some 23 million people worldwide have been damaged by HIV.[1] It is less well known that malnutrition impairs the immune systems of at least 100 million young children and several million pregnant women, none of them infected by HIV. But unlike the situation with AIDS, the 'cure' for immune deficiency due to malnutrition has been known for centuries: It is achieved by ensuring an adequate dietary intake containing all essential nutrients. Today, more is being learned about the specific role of individual nutrients in the functioning of the immune system, knowledge that will help in the design of interventions that can improve the situation in the near future. This knowledge also reinforces the importance of striving to ensure that everyone in the world has access to a diet that is adequate in both quality as well as quantity.

Scientists have known for some time that malnutrition and infection are connected. A 1968 monograph by WHO, entitled 'Interactions of Nutri-

The 'cure' for immune deficiency due to malnutrition has been known for centuries: It is achieved by ensuring an adequate dietary intake containing all essential nutrients.

Fig. 11 Measles deaths and vitamin A supplementation

In three separate trials of children hospitalized with measles — one as early as 1932 — deaths among children given high-dose vitamin A supplements were significantly lower than among children not supplemented. The consistent results suggest that a change in vitamin A status can rapidly alter basic physiological functions concerned with cellular repair and resistance to infection, thereby saving lives.



Source: Alfred Sommer and Keith P. West Jr., Vitamin A Deficiency: Health, survival and vision, Oxford University Press, New York, 1996.

tion and Infection', was one of the first comprehensive statements of some of these links.

The threat that vitamin A deficiency poses to the lives of young children has already been described. Within a few years, the scientific community went from calling the fact that vitamin A supplements could reduce child mortality "too good to be true" to calling it "too good not to be true." But the many ways vitamin A deficiency increases child deaths were not well understood until recently. Now the results of a dozen field studies, conducted in Brazil, Ghana, India, Indonesia, Nepal and elsewhere, indicate that supplementing the diets of children who are at risk of vitamin A deficiency can reduce deaths from diarrhoea. Four of the studies that focused on diarrhoea showed that deaths were reduced by 35-50 per cent. The vitamin can also halve the number of deaths due to measles[3] (Fig. 11).

In Bangladesh, breastfed infants whose mothers were given a single oral high-dose supplement of vitamin A shortly after giving birth had significantly fewer days of sickness because of respiratory infections and febrile illnesses during the first six months of life than did infants born to unsupplemented mothers from the same socio-economic group in the same area.[1]

Zinc is another micronutrient that has long been known to be essential for the growth and development of cells and for the functioning of the immune system. However, because zinc deficiency is extremely difficult to measure, little attention was paid until recently to the possibility that it might impair child health and development (Fig. 12).

Trials in Bangladesh, India and Indonesia have already shown reductions of about one third in the duration and severity of diarrhoea in children receiving zinc supplements and a median 12 per cent decline in the incidence of pneumonia.[4] In these investigations, zinc supplements did the most good for those children who started out the most malnourished.

A study recently completed in Lima (Peru) found that the benefits of zinc supplementation on immunity can begin even before birth. Researchers from the Johns Hopkins School of Public Health in Baltimore (US) and the Instituto de Investigación Nutricional in Lima have been adding zinc to the iron and folate supplements of pregnant women and testing its impact on the health of their newborn children, including its effects on immune system activity. Initial analysis shows that antibody levels just after birth are higher in the children of zinc-supplemented mothers than in those receiving a placebo.

Zinc supplementation appears so effective in reducing the incidence of diarrhoea and pneumonia in poor countries that one scientist, Robert Black of Johns Hopkins University, has suggested that zinc supplements are as significant a public health intervention for diarrhoea reduction as improvements in water and sanitation. And major new research indicates that even the effects of malaria, a deadly enemy of both children and adults, may be lessened by zinc and vitamin A (Panel 18).

Iron deficiency can also damage the immunity of a growing child, impairing the body's ability to kill invading pathogens and leading to increased illness in iron-deficient populations.[5] In studies in Egypt, anaemic children had longer and more severe episodes of diarrhoea than did their iron-fortified peers.

Basic science is now able to explain why these astonishing results occur. Thus far, zinc and vitamin A are the two micronutrients that have proved to be the most closely linked

BEST COPY AVAILABLE

with the proper functioning of the body's front-line defences. These two micronutrients help maintain the physical barriers of skin and mucosa that prevent micro-organisms from invading the body, as well as enhancing the activity of leukocytes such as NK (natural killer) cells and macrophages — scavenger cells that engulf, then destroy, foreign pathogens such as bacteria throughout the body.

Equally important, low dietary consumption of zinc and vitamin A reduces the number and impairs the development and function of two types of B-cells — key players in 'acquired immunity'. These produce antibodies and T-cells that, in turn, are responsible for eliminating virus-infected host cells. They also produce biochemicals known as cytokines, which further promote B-cell and macrophage activity. At the same time, an adequate intake of zinc is now understood to be necessary in order for both vitamin A and iodine to do many of their vital jobs.

Nutrition and AIDS

The role of nutrition in preventing infection is now being investigated as one possible way to help reduce the transmission of AIDS. Vitamin A may form part of the arsenal needed to combat HIV, which is expected to infect between 4 million and 5 million children by early in the next century, most of them in sub-Saharan Africa. These children will mainly be infected by their mothers.

The routes of mother-to-child transmission of HIV, also known as vertical transmission, are threefold: during pregnancy, during labour and delivery, and through breastfeeding.

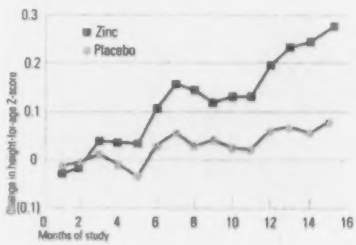
Scientists have been exploring the possibility of reducing vertical transmission in all three routes since 1994. They have tried to block intrauterine transmission by giving women doses of the antiretroviral drug Zidovudine during pregnancy. The drug has been shown to reduce mother-to-child transmission of HIV — but at hundreds of dollars per course, it is prohibitively expensive for most people in the developing world. Less expensive methods of antiretroviral therapy during pregnancy, such as administering Zidovudine for shorter periods or using cheaper drugs, are now being tested in Haiti, sub-Saharan Africa and South-East Asia.

Two other treatments during pregnancy are also under investigation. These involve either intravenous therapy with purified anti-HIV antibodies, or supplementation with vitamin A. In a 1994 study of HIV-infected women in Malawi, it was found that 32 per cent of those who were vitamin A deficient during pregnancy had passed HIV on to their infants. In contrast, only 7 per cent of HIV-infected women with sufficient levels of vitamin A did so. The study concluded that vitamin A-deficient women were thus four and a half times more likely to infect their children.[5]

Also, a 1995 study from Kenya reported that the concentration of HIV in breastmilk is higher in vitamin A-deficient mothers than in those with good vitamin A status. Another study, also from Kenya, has shown that HIV-positive women who are also vitamin A deficient were five times more likely than non-vitamin A-deficient women to shed HIV-infected cells in their reproductive tracts, a factor that may be an important determinant of both sexual and vertical transmission of AIDS. However, some experts have suggested that these results may have come about not because of the influence of vitamin A on HIV transmission, but because poor vitamin A status and high rates of infection occur together for other reasons.

Fig. 12 Zinc supplementation and child growth (Ecuador, 1986)

Zinc's importance in ensuring normal growth and development is underlined in a 1986 study of Ecuadorian pre-schoolers with low zinc intake. The children were paired by sex, age and height, one in each pair was given a zinc supplement, the other a placebo. The results over 15 months showed a slow, steady gain in the supplemented children's height as compared with the non-supplemented group.



Note: The height-for-age Z-scores in the chart refer to the number of standard deviations below or above the median height for healthy children in the same age group.

Source: H. Dirren et al., 'Zinc supplementation and child growth in Ecuador', in Nutrient Regulation during Pregnancy, Lactation and Infant Growth, Plenum Press, New York, 1994.

BEST COPY AVAILABLE

Zinc and vitamin A: Taking the sting out of malaria

UNICEF/97-0558/Clausen

Early evidence from a study in Papua New Guinea suggests that zinc and vitamin A supplements may boost children's resistance to one of the world's most insidious infectious diseases: malaria.

Two fifths of the world's population, in 90 countries across sub-Saharan Africa, Asia and Central and South America, is at risk of contracting malaria. At least 300 million people worldwide endure its recurrent fevers, malaise, anaemia and risk of seizures or coma. Malaria kills from 1.5 million to 2.7 million people annually. It is the sixth leading cause of disability among children under four years of age in the developing world. Some 600,000 young children die of malaria alone each year; over 1 million die of malaria in conjunction with other illnesses — a rate of one child every 30 seconds.

Many approaches have already been tried to combat the disease. However, the parasite that causes malaria is no longer vulnerable to some of the most powerful anti-malarial compounds available. For a time, the widespread use of pesticides in the 1950s managed to suppress the Anopheles mosquito that transmits the parasite, but it, too, has developed resistance.

Arming the body to defend itself through immunization is one approach to preventing the disease. But vaccines are difficult to develop since the parasite moves between organs, changing its appearance from stage to stage and hiding from the immune system in a place that the immune system doesn't check: inside red blood cells. Consequently, the best vaccines to date have managed to protect only around 30 per cent of test populations from infection.

However, naturally acquired resistance does develop over time as people are repeatedly exposed to the parasite. A recent study by the Johns Hopkins School of Public Health and the Papua New Guinea Institute of Medical Research investigated the ability of vitamin A and zinc to help boost such natural resistance.

Nearly 800 children under the age of five were enrolled in the study. All of the children lived in an area of north-western Papua New Guinea where malarial infection is common. The parasite that is responsible for the disease can be found in the blood of over 40 per cent of under-fives in the region, and it is the major cause of death among children from the age of six months to four years.

In controlled trials, regular vitamin A and zinc supplementation appeared to be complementary in decreasing the burden of malaria in children. According to Dr. Anuraj Shankar of Johns Hopkins University, chief researcher of the study, vitamin A reduced by more than a third the febrile illnesses due to mild to moderately high levels of malaria parasites in children and significantly reduced spleen swelling, an indicator of chronic malaria. However, it had little influence on the worst cases, where children had a very high number of parasites in their blood.

Zinc, on the other hand, helped blunt the severity of the worst cases. As a result, there were over a third fewer malaria cases seen at health centres among those given zinc than among those given a placebo. In addition, overall clinic visits by those children who had received zinc decreased by a third, and signs of other infections (cough and diarrhoea, for example) were reduced by 20–50 per cent.

The Papua New Guinea experience shows that vitamin A and zinc status in children may be as important in reducing malaria as other commonly used malaria-control techniques, such as insecticide spraying and the use of insecticide-treated bed nets. And the cost is minimal:

A year's supply of zinc supplements costs $1 per child, with an additional 10 cents for vitamin A capsules.

A second study is under way in the Peruvian Amazon to measure the effectiveness of vitamin A and zinc in boosting the efficacy of antimalarial drugs. Peruvian scientists at the Loreto Department of Health and colleagues from Johns Hopkins are studying more than 1,000 children who are suffering from malaria to see if a short, five-day course of zinc or vitamin A in conjunction with antimalarial drugs improves their health. Some children are receiving both the micronutrients, in the hope that the zinc-vitamin A combination will be more effective, as zinc is known to promote vitamin A metabolism in the body.

Despite the surge of international interest in malaria from both the public sector and private industry and the promise that vitamin A and zinc may hold, funding for research into disease prevention and treatment unfortunately remains meagre. Currently, funding levels run at roughly $42 per malaria death, compared with $3,274 for each AIDS fatality.

Photo: Women and their children wait outside a UNICEF-assisted health centre in the Peruvian Amazon, where malaria is a major health concern.

Based on the findings of the first studies — and to demonstrate whether the connection between vitamin A and HIV transmission is causal — four clinical trials were begun recently to examine HIV transmission rates in women who have received vitamin A supplements during the second or third trimester of pregnancy. Results from these studies, conducted in Malawi, South Africa, Tanzania and Zimbabwe on a total of nearly 3,000 HIV-infected women, are expected soon.

Using nutrition to reduce maternal deaths

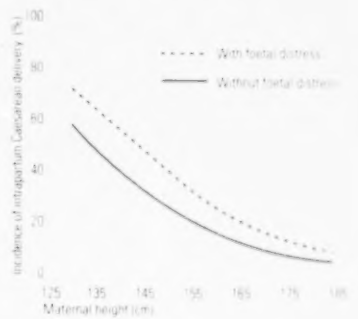
Maternal mortality is a tragedy in social, economic and public health terms. WHO and UNICEF have noted that of the 585,000 yearly maternal deaths around the world, the vast majority are preventable. About 80 per cent of these deaths are the result of five direct obstetric causes: haemorrhage, infection, obstructed labour, unsafe abortion and a convulsive disorder in late pregnancy called eclampsia.

As already noted, obstructed labour is more likely to occur among women who were stunted in childhood (Fig. 13). It is estimated that anaemia may be responsible for as much as 20 per cent of maternal mortality, particularly those deaths from haemorrhage and possibly infection. Anaemia also increases the risk of morbidity and mortality associated with any major surgical intervention, including Caesarean section.

Programmes already exist to reduce anaemia in pregnant women. More work is needed, however, not only to make iron/folate supplementation programmes more effective, but also to improve the treatment and prevention of malaria and hookworm. Both of these are conditions that also contribute to maternal anaemia.

Fig. 13 Maternal height and Caesarean delivery (Guatemala, 1984-1986)

The importance of good nutrition for girls and women is affirmed in a mid-1980s' study of pregnant Guatemalan women, which found that the risk of having an intrapartum Caesarean delivery was 2.5 times higher in short mothers than in tall mothers. Short stature in women is often a consequence of poor growth in early childhood.



Source Kathleen M. Merchant and Jose Villar, 'How do maternal and newborn size affect risk of foetal distress and intrapartum Caesarean delivery?' (draft).

BEST COPY AVAILABLE

Impact of deficiency

Vitamin A deficiency makes children especially vulnerable to infection and worsens the course of many infections. Supplementation with vitamin A is estimated to lower a child's risk of dying by approximately 23 per cent. The deficiency is also the single most important cause of blindness among children in developing countries.

Who is affected

Over 100 million pre-school-age children suffer from vitamin A deficiency. Vitamin A deficiency is also likely to be widespread among women in their reproductive years in many countries.

What vitamin A does

Vitamin A, stored normally in the liver, is crucial for effective immune-system functioning, protecting the integrity of epithelial cells lining the skin, the surface of the eyes, the inside of the mouth and the alimentary and respiratory tracts. When this defence breaks down in a vitamin A-deficient child, the child is more likely to develop infections, and the severity of an infection is likely to be greater.

Depending on the degree of the deficiency, a range of abnormalities also appears in the eyes of vitamin A-deficient children. In the mildest form, night-blindness occurs because the rods in the eye no longer produce rhodopsin, a pigment essential for seeing in the dark. In more severe forms, lesions occur on the conjunctiva and the cornea that if left untreated can cause irreversible damage, including partial or total blindness.

Sources

Vitamin A is found as retinol in breastmilk, liver, eggs, butter and whole cow's milk. Carotene, a precursor of vitamin A that is converted to retinol in the abdominal walls, is found in green leafy vegetables, orange and yellow fruits, and red palm oil.

Even if an adequate nutritional status were achieved in adolescent girls and women before their first pregnancy, this would never eliminate the need for good medical care in pregnancy and childbirth. But some day it may help reduce the tragic burden of maternal mortality and the need for certain medical interventions. Some of the connections between nutrition and maternal mortality suggested below are not yet definitively demonstrated or part of programme activities, but they hold great promise for the future. A few are especially worth mentioning:

► Even given the many known benefits of good vitamin A status, it is nonetheless remarkable to find that improving the vitamin A status of pregnant women whose intake of the vitamin is low also dramatically reduces maternal mortality (Panel 1). Deadly infections in pregnancy, as in childhood, find a formidable adversary in vitamin A. The use of low-cost, low-dose vitamin A capsules as well as improvements in diet make it highly probable that this new research will be easily incorporated into programmes.

► Zinc deficiency, increasingly recognized as widespread among women in developing countries, is associated with long labour, which increases the risk of death. Severe zinc deficiency is also believed to impair foetal development in a number of ways. Zinc is important for the synthesis of hormones and enzymes essential to childbirth — especially estrogen-dependent functions such as expulsion of the placenta and proper contraction of uterine muscles during birth — as well as for immune-system development. A number of studies around the world have found that zinc supplementation has reduced complications of pregnancy. Several studies are under way that will soon help define the impact of improved zinc status on pregnant women.

► It has long been known that iodine deficiency in women increases the risk of stillbirths and miscarriages. And there is evidence that, in highly iodine-deficient areas, another result of this deficiency may be increased maternal mortality through severe hypothyroidism.

► A recent study in the United States showed that calcium supplementation did not reduce the risk of hypertension in pregnancy that could result in death, but a number of experts have suggested that supplementation might reduce this risk in areas where women are especially calcium deficient.

► Folate deficiency, now well known to induce neural-tube birth defects if it is present during the first month of pregnancy, may also represent a risk for maternal morbidity and mortality, as well as increase the risk of low birthweight.

The clear message emerging from these connections is that improving women's nutritional status — by increasing their intake of micronutrients as well as their overall food consumption, and by taking steps to reduce their workload and improve their access to health care — may offer considerable, low-cost benefits in reducing maternal deaths. But there is still no international consensus on the benefits to be gained by supplementation during pregnancy with nutrients other than iron and folate.

The real challenge is to reach women well before they become pregnant — indeed, to help adolescent girls achieve the best nutritional status possible before they enter their reproductive years. This would not only help reduce maternal mortality but would also reduce the prevalence of low birthweight, the risk of birth defects and the rates of stillbirths and early infant mortality. All of these re-

main scientific and programmatic challenges, along with the imperative of ensuring that women's health is positioned high on the health and development agendas of all countries.

Breastfeeding: Good for mothers' health too

In addition to the nutritional status of adolescent girls and women, there is another important connection between nutrition and maternal mortality. A number of studies have shown a strong link between the early initiation of breastfeeding and reduced risk of postpartum haemorrhage.

Initiating breastfeeding immediately following birth, as most women do in baby-friendly hospitals, stimulates the contraction of the uterus and reduces blood loss. For this reason, the continuing spread of the Baby-Friendly Hospital Initiative should also contribute to the reduction of maternal mortality.

In recent years, research has also demonstrated that this immediate post-partum benefit is by no means the only way in which breastfeeding can improve women's health. A recent large-sample study in the United States demonstrated that women who breastfed their children had a lower risk of breast cancer in the premenopausal period, and the longer they breastfed, the lower the risk.[7] These results show that protecting, promoting and supporting breastfeeding has benefits for women that go beyond the remarkable effects, already well understood, that protect their children from illness and death.

Prevention of chronic diseases

Chronic degenerative diseases are largely regarded as diseases of affluence. In industrialized countries, improvements in living standards and health care have led to increased life expectancy, allowing people to live long enough to develop such chronic illnesses. Chronic diseases are also associated with the sedentary lifestyle and over-abundant diet prevalent in many industrialized nations.

Arguments are being made, however, that these chronic diseases in large measure may also be diseases of poverty — particularly poverty early in life and during foetal development. The hypothesis is particularly intriguing in light of the fact that ischaemic heart disease is projected to be the world's leading cause of death and disability in the year 2020.[8]

Professor David Barker and his colleagues at the Medical Research Council (MRC) Environmental Epidemiology Unit in Southampton (UK), first raised the "foetal origins of adult disease" hypothesis over a decade ago, noting a link between low birthweight and the incidence of cardiovascular disease among middle-aged men and women born in the United Kingdom.[9]

Since then, over 30 studies around the world have indicated that low-birthweight babies who were not born prematurely have a higher incidence of hypertension later in life than those with a normal birthweight,[10] independent of their social class and such adult risk factors as smoking, drinking and overeating.

Low birthweight, as well as thinness at birth, has also been correlated with glucose intolerance in childhood[11] and non-insulin dependent diabetes in later life.[12]

Professor Barker and his colleagues speculate that maternal dietary imbalances at critical periods of development in the womb can trigger a redistribution of foetal resources, affecting a foetus's structure and metabolism in ways that predispose the

Impact of deficiency

Zinc deficiency in malnourished children contributes to growth failure and susceptibility to infections. Zinc deficiency is also thought to be associated with complications of childbirth.

Who is affected

Data on the prevalence of zinc deficiency are unavailable, as there is no reliable method of determining zinc status at the population level. Zinc deficiency is likely to be a public health problem, however, in areas where overall malnutrition is prevalent; it is now recognized as such in many countries.

What zinc does

Zinc promotes normal growth and development. It forms part of the molecular structure of 80 or more known enzymes that work with red blood cells to move carbon dioxide from tissues to lungs. Zinc also helps maintain an effective immune system. Severe zinc deficiency causes growth retardation, diarrhoea, skin lesions, loss of appetite, hair loss and, in boys, slow sexual development. Zinc has now been shown to have a therapeutic effect on diarrhoea cases.

Sources

Breastmilk has small amounts of zinc that are readily absorbed. Other sources include whole-grain cereals, legumes, meat, chicken and fish. Vegetables and fruits contain little zinc but when eaten with cereals may increase the bioavailability of zinc in cereals.

Impact of deficiency

Iron deficiency anaemia, the most common nutritional disorder in the world, impairs immunity and reduces the physical and mental capacities of populations. In infants and young children, even mild anaemia can impair intellectual development. Anaemia in pregnancy is an important cause of maternal mortality, increasing the risk of haemorrhage and sepsis during childbirth. Infants born to anaemic mothers often suffer from low birthweight and anaemia themselves. Causes include blood loss associated with menstruation and parasitic infections such as hookworm, but an inadequate intake of iron is the main cause.

Who is affected

Nearly 2 billion people are estimated to be anaemic and even more are iron deficient, the vast majority of them women. Between 40 and 50 per cent of children under five in developing countries — and over 50 per cent of pregnant women — are iron deficient.

What iron does

The body needs iron to produce haemoglobin, the protein in red blood cells responsible for carrying oxygen. Iron is also a component of the many enzymes essential for the adequate functioning of brain, muscle and the immune-system cells.

A certain amount of iron is stored in the liver, spleen and bone marrow. Iron deficiency develops as these stores are depleted and there is insufficient iron absorption. In anaemia, the iron deficiency is so severe that the production of haemoglobin is significantly reduced. The main symptoms and signs are paleness of the tongue and inside the lips, tiredness and breathlessness. Deficiencies of folic acid, vitamin A, ascorbic acid, riboflavin and various minerals can also contribute to anaemia.

Sources

Iron is found in liver, lean meats, eggs, whole-grain breads and molasses.

individual to later cardiovascular and endocrine diseases. The correlation between low birthweight and later cardiovascular disease and diabetes may arise from the fact that nutritional deprivation in utero 'programmes' a newborn for a life of scarcity. The problems arise when the child's system is later confronted by a world of plenty.[14]

In central India, an ambitious study has been funded by UK Wellhome Trust and coordinated by Dr. Ranjan Yajnik at the King Edward Memorial Hospital Research Centre in Pune (India) and Dr. Caroline Fall at the MRC Environmental Epidemiology Unit. It is exploring the impact that a mother's nutrition may have on the development of diabetes, high blood pressure and coronary heart disease in her offspring when they reach adulthood. The results could resolve some of the uncertainties about causation of chronic illness, offering nutritional information relevant to both developing and industrialized countries.

The study has followed over 800 women through pregnancy, monitoring foetal growth, maternal weight gain and biochemical indicators of nutritional status.[15] The nutritional value of the women's daily food intake — including calorie, protein and micronutrient content — was measured and recorded. Within 24 hours of birth, both infant and placenta were weighed and other body measurements made.[16] Almost one third of the nearly 800 infants born during the study were classified as low birthweight, under 2.5 kg.[17] An interesting early finding suggests that birthweights are most strongly associated with the size of the mother — not just her weight gain during pregnancy, a well-known determinant of newborn size, but also her weight, height, percentage of body fat and head circumference *before* conception. The weight and body mass index of many of the women before pregnancy suggested chronic undernutrition. The study also suggested that women's diet during pregnancy did not appear to have influenced foetal size substantially, although regular consumption of two particular items — green leafy vegetables and dairy products — was associated with larger birth size. These early findings lend support to the premise that building a sturdy baby depends on good nutrition for the expectant mother throughout her life.

The children from the Pune study are growing up in a society of increasing urbanization and prosperity. Urban dwellers in India are already five times more likely to develop diabetes than their rural relatives,[18] and those who have migrated to industrialized countries like the United Kingdom die in significantly larger numbers from coronary heart disease than their indigenous white counterparts.[19]

In 1999, the first of the children in the study will be tested for signs of glucose intolerance and insulin resistance; these are early hints of diabetes that have already been noted in children of low birthweight in Pune.[20] Soon after, blood pressure monitoring will begin in an effort to look for initial signs of hypertension. As the study progresses, findings can be related back to birth size, foetal growth and maternal diet before and during pregnancy. From an undertaking of this magnitude, clear evidence may emerge about the importance of improving maternal nutrition as a means of preventing chronic later-life disease in children — before these children have children of their own.

New ways to reduce malnutrition deaths in emergencies

The sheer extent of mild and moderate malnutrition makes these conditions

responsible for much more sickness and death globally than does severe malnutrition. But a severely malnourished child — usually defined as under 70 per cent of the median weight-for-height reference or having oedema (water retention and swelling) at least in the feet — is at very high risk of death, and requires prompt and intensive care in a health facility.

Until recently, health professionals dealing with severe malnutrition in emergency situations or in large hospitals in poor countries had been using an approach practised for years. The protocol was to treat infectious conditions, correct rehydration and feed, at least in the early stages, with high-energy milk — usually a combination of dried skim milk, vegetable oil and sugar. In the last few years, however, with the help of WHO and the benefit of the experience of a number of NGOs specializing in this field, the new protocol is improving the treatment of severe malnutrition.

While the new protocol retains some elements of former standard practices, there are significant changes. The milk now recommended for the early stages of therapeutic feeding, for example, is enhanced by the addition of both oil and a vitamin and mineral mix, which addresses the special micronutrient imbalance that accompanies severe malnutrition. Called F-100 because it gives 100 kilocalories per 100 grammes, the milk optimizes the chance for rapid weight gain and the eventual recovery of a severely malnourished child.

Another important change is a new recommendation calling for modification of the standard oral rehydration salts (ORS) to address the special electrolyte needs of severely malnourished children. The use of standard ORS has been known to increase risk of heart failure and sudden death among certain severely malnourished children. The revised ORS reduces that risk. Known as ReSoMal (rehydration solution for malnutrition), it contains more potassium and different concentrations of elements from those in standard ORS.

The new protocol for the care of the severely malnourished also emphasizes elements that have been known by nutrition workers for some time, but perhaps not well enough to be integrated into regular practice. These include the need for rapid attention to clinical factors, such as low body temperature (hypothermia) and low body sugar (hypoglycaemia), as well as to less strictly medical factors such as meeting malnourished children's great needs for emotional support, intellectual stimulation and play. Experienced emergency nutrition personnel working in places such as the Great Lakes region of Central Africa and the Democratic People's Republic of Korea have adopted this method and noted how quickly it helps reduce mortality. One challenge is to ensure that supplies of the appropriate high-energy milk and rehydration solution are steady and sufficient (Panel 19).

New ways to measure malnutrition

Much of the new knowledge described above will contribute to effective actions to reduce malnutrition and related conditions. But even when actions are effective, assessing their impact is often difficult. Measuring malnutrition initially can also pose problems — and make it difficult to place the issue on the policy and programme agenda.

There is thus a need for assessment and analysis techniques that are low in cost, produce rapid results and are easy to use and understand. Here are some of the promising new tools:

Impact of deficiency

Iodine deficiency is the single most important cause of preventable brain damage and mental retardation, most of the damage occurring before birth. It also significantly raises the risk of stillbirth and miscarriage for pregnant women.

Who is affected

The successful global campaign to iodize all edible salt is reducing the risk associated with this deficiency, which threatened 1.6 billion people as recently as 1992. Nevertheless, it is estimated that 43 million people worldwide are suffering from varying degrees of brain damage; there are an estimated 11 million overt cretins. Some 760 million people have goitres.

What iodine does

Iodine is needed by the thyroid gland for normal mental and physical development. Most commonly and visibly associated with goitre (a swelling of the neck as the enlarged thyroid works to collect iodine from the blood), iodine deficiency takes a graver toll in impaired mental acuity. Persons suffering from IDD face a range of serious impairments including cretinism, spastic diplegia (a spastic paralysis of the lower limbs) and dwarfism. Less severe deficiencies in both adults and children can mean the loss of 10 to 15 intelligence quotient (IQ) points, as well as impaired physical coordination and lethargy.

Sources

Iodized salt is the best source of iodine. Sea fish and some seaweed also contain iodine, although sea salt does not.

Panel 19

Protecting nutrition in crises

UNICEF/94-0277/Press

When refugees stream into a country, when families lose their homes, fields and crops in war or disaster, when children cry from hunger, it is not surprising that food can seem like the only priority and the only answer to averting widespread malnutrition.

But in emergencies as well as in other situations, *food, health and care* are all crucial to saving lives. Access to basic health services and water and sanitation facilities is essential in emergencies not only to keep children alive, but also to protect their growth and development. To prevent outbreaks of measles, mass immunization usually along with the distribution of vitamin A supplements has become standard practice in emergencies. In Haiti, for example, a measles vaccination campaign in 1994-1995 reached almost 3 million children, helping end an epidemic that began when the country was in the midst of civil unrest.

Preventing death and malnutrition from cholera and other diarrhoeal diseases — through adequate sanitation, access to safe water and oral rehydration therapy — saved thousands of children's lives in the recent emergencies in Rwanda and Somalia. This is standard practice in the current emergency in Burundi, for example.

Breastfeeding is an important element of nutrition-related 'care' in emergencies. There has been marked progress in this area as governments and agencies become increasingly sensitive to supporting women's ability to breastfeed. Workers with some NGOs that specialize in preventing malnutrition in times of crisis have had success in recent years in promoting relactation — helping women who may have been separated from their children to begin breastfeeding again after having stopped.

Sometimes infant formula must be used in emergencies — for instance, when young children have been separated from their mothers. In these cases, all UN agencies working in emergencies and many NGOs have committed to supplying only generically labelled (no brand name) formula, to prevent commercial exploitation of emergency situations. During the conflict in Bosnia and Herzegovina, UNICEF and other UN agencies jointly urged that infant formula distribution be severely limited, and relief organizations subsequently ended mass distribution programmes in January 1995. UNICEF and WHO strongly promoted breastfeeding, targeting health workers and joining with local health professionals during and after the war to develop a national policy on infant feeding.

Children ages 6 to 18 months, pregnant women and women who are breastfeeding all need energy-dense, nutrient-dense foods. In emergencies, the approach to meeting these special needs varies. Agencies that are part of the International Federation of Red Cross and Red Crescent Societies, for example, try to provide a family ration to meet everyone's requirements, including those of children and pregnant and breastfeeding women. The World Food Programme and some other agencies generally distribute a ration that meets minimum needs and, in addition, they cover vulnerable groups with supplementary feeding programmes. The comparative benefits of the two approaches need to be evaluated.

Triple A — assessment, analysis and action — is an essential approach in emergencies as well as in other situations. Monitoring children's nutritional status, with weight-for-height a commonly used indicator, is crucial during emergencies to help target resources and reach the most affected.

Early warning systems and emergency preparedness are cost-effective means to prevent malnutrition in emergencies. The United Nations Department of Humanitarian Affairs' early warning system draws on the work of similar systems within and outside the United Nations in preparing comprehensive assessments of potential emergency situations, and UNHCR and other agencies have set up rapid deployment mechanisms for emergencies. Nonetheless, early warning systems and emergency planning and preparedness remain sadly underfinanced, a shortfall that endangers children in particular when crises loom.

Photo: Health workers vaccinate two girls at a camp for unaccompanied Rwandan refugee children in the Democratic Republic of the Congo

► ***A simplified way to look for vitamin A***: Population-level surveys of vitamin A status have been a particular challenge. In the past, when it was thought that the main impact of vitamin A deficiency was damaged eyes and blindness, population surveys of vitamin A status involved examining children's eyes for early signs of damage. Now that it is understood that this deficiency has lethal consequences on a subclinical level — that is, at levels of deficiency that do not yet show up as damage to the eye — more sensitive methods of detecting its presence are needed.

Most of the national or regional vitamin A surveys that have been conducted in recent years have used blood retinol as the principal indicator of vitamin A status. There are some difficulties with the interpretation of this indicator, and it is expensive and difficult to collect and analyse the venous blood samples needed for these surveys.

A new technique that promises to be easier, cheaper and less invasive is 'dark adaptometry'. This method, which has been tested and found effective in several field situations,[1] takes advantage of the fact that in very early stages of vitamin A deficiency the ability of the pupil of the eye to constrict under illumination is impaired. By flashing a simple handheld light at one pupil and covering the other, the degree of impairment of the pupillary reflex can be estimated. It is hoped that this simple method, which is non-invasive, will become widely available soon.

► ***'Dipsticks' for iodine deficiency:*** Iodine deficiency disorders (IDD) can be assessed in populations by palpating goitres, but this method requires a high level of training and is less useful as goitres begin to disappear with better access to iodized salt.

UNICEF: 93-1726/Lemoyne

Interaction and stimulation are essential to sound nutrition as well as intellectual and emotional development. In China, a boy delights in his meal and the attention of his aunt.

Since iodine excreted in the urine is a good indicator of iodine consumed, IDD can be reliably detected by analysing urine samples. Many countries have undertaken urinary iodine surveys, which involve collecting samples, preserving them carefully and sending them to a laboratory for analysis in a central location.

A new technique may eliminate some of those steps and much of the cost. A reagent-treated testing strip or 'dipstick' now being developed will simplify the procedure by allowing the iodine content of urine to be analysed and read directly on the spot without transporting samples to a laboratory. It is hoped that this tool will soon be available for field surveys.

► ***Improved test kits for iodized salt:*** Simple iodized salt test kits have helped make salt-testing a community affair. Anyone can use the small plastic bottles of test solution that cause salt to turn blue if it is iodized, and some countries have distributed these kits to schoolchildren, teachers and community workers. The test kits, however, have a limited shelf life, and they do not distinguish very sensitively among levels of salt iodization. Work is now under way to improve the test kit in both these respects and make it an even more useful assessment tool.

► ***Computerizing anaemia surveys:*** Thanks to computer chips, assessment of anaemia at the population level is becoming easier. There have been methods for some time to assess peripheral blood (from a fingertip, for example) without sending the samples to a laboratory, but some of them are slow and inaccurate.

Portable electronic haemoglobinometers are now available, however, that enable blood to be drawn easily from a finger into a small cuvette that is inserted directly into a machine that gives a digital read-out of the precise haemoglobin level in a few seconds. The wider use of these machines in population surveys will help to raise awareness of the enormous magnitude of the anaemia problem.

New ways to enrich diets

There are many ways to enhance foods to improve the content of the vitamins and minerals that are so important for the well-being of children and their families. Food fortification is one very important way of doing this, and has already helped overcome micronutrient deficiencies in many industrialized countries and some developing ones.

But many of the world's poorest people eat locally grown crops that cannot be fortified. Agricultural scientists are now demonstrating that staple crops can be modified in several ways at the breeding stage, with great nutritional benefit.

The grains and tubers on which the vast majority of people in the developing world depend have certain inherent shortcomings nutritionally. For one thing, these staples tend not to provide all the minerals and vitamins needed to ensure good nutrition. In addition, cereals, depending on several factors, including the degree to which they are refined, contain substances that impede the 'bioavailability' of some important minerals — the ability of the body to absorb and use them. The most important of these substances is known as phytate, a molecule containing phosphorus. Micronutrients usually come from non-staple foods — animal products, vegetables and fruits. But the poorest populations often cannot afford these foods and depend on the grains and tubers they can afford. This fact helps explain the high

prevalence of some micronutrient deficiencies.

Agricultural research has turned to the science of plant breeding to improve this situation. The goal is to develop staple food crops that contain higher quantities of essential micronutrients — or lower amounts of phytate. In this connection, work is currently being done in the United States to develop low-phytate grain foods for animal consumption. Such grains hold nutritional promise for people as well, according to the results of a recent study, which found that human volunteers absorbed iron at a significantly higher rate from foods prepared using a new low-phytate strain of corn than from an older higher-phytate strain.[22]

The Consultative Group on International Agricultural Research, made up of 17 internationally funded agricultural research centres, is trying to raise farm productivity and food consumption in developing countries. The group is now coordinating a global effort to increase the micronutrient content of five major staple food crops: rice, wheat, maize, beans and cassava. The aim is to breed plants that load high amounts of vitamins and minerals into their edible parts — and also into their seeds, allowing them to enrich themselves for subsequent harvests without changing their taste, texture, or the ease with which they are grown.

In developed countries, such crops have already been successfully produced: high-zinc wheat, for example, is being grown in Australia. Estimates are that it will take 6 to 10 years to breed comparable new plants in developing countries. Scientists believe that they will not only improve the daily dietary intake in the developing world but will also significantly increase crop yields because these micronutrient-dense plants have better germination and more resistance to infection at the vulnerable seedling stage.

More effective action for nutrition improvement

The technical advances described in this report, whether new research on nutrition and illness or better ways to detect problems, are not magic bullets. They will contribute to sustainable improvement in nutrition only if they sharpen the ability of people, including the poor, to assess and analyse the causes of malnutrition around them — and to plan and carry out appropriate responses.

Recent advances in the fields of social science and communication will also help accelerate and sharpen people's ability to take control of actions to reduce malnutrition.

Actions described here to improve child nutrition and thereby improve growth, resistance to illness and cognitive development need to be coupled with other highly effective low-cost interventions that have already been proven to prevent disease and improve child development.

Some of these have yet to be widely exploited. For example, intestinal worms, which contribute to poor growth and development, can be combated through routine deworming using low-cost drugs that are both very safe and highly effective (Panel 20). And child deaths from malaria can be reduced through the use of insecticide-impregnated mosquito nets. These measures have not received adequate global attention and resources, even though every child has a right to their benefits.

Actions to prevent malnutrition in young children also need to be linked to efforts to promote early child development through stimulating play and early learning, and by strengthen-

Impact of deficiency

Folate deficiency causes birth defects in the developing foetus during the earliest weeks of pregnancy — before most women are aware that they are pregnant. Folate deficiency has been found to be associated with a high risk of pre-term delivery and low birthweight, though it is not clear that this would hold in all populations. Folate deficiency also contributes to anaemia, especially in pregnant and lactating women.

Who is affected

Although data are not abundant, in several developing countries women in their reproductive years have been found to have very high rates of folate deficiency. Young children are also likely to be at risk.

What folate does

This B vitamin helps in the formation of red blood cells. Folate also regulates the nerve cells at the embryonic and foetal stages of development, helping to prevent serious neural tube defects (of the brain and/or spinal cord).

Sources

Folate is found in almost all foods, but the best sources are liver, kidney, fish, green leafy vegetables, beans and groundnuts.

Panel 20

Progress against worms for pennies

UNICEF/5847/Vilas

Asked to name the most widespread diseases, few people would think of including worms. Yet, helminth (worm) infections are indeed one of the most common — and neglected — of diseases, affecting more than 30 per cent of the world's people. Health, productivity and physical and mental capacity may all suffer.

Children in developing countries are the most severely affected, particularly those between the ages of 5 and 14, in whom intestinal worms account for up to 12 per cent of total disease burden — the largest single contributor. While the impact of worms on health and growth is commonly believed to be most significant in children after they reach the age of five, a new study in India links worm infection with growth faltering in children between one and four years old.

As many as 150,000 children die each year from intestinal obstruction and other abdominal complications caused by large adult worms. In millions more, worms are a significant cause of malnutrition, stunting growth and causing severe anaemia, dysentery, delayed puberty and problems with learning and memory. In 1990, an estimated 44 million pregnant women were infected with hookworm; their foetuses, therefore, were at risk of retarded intrauterine growth, prematurity and low birthweight.

Transmission is insidiously easy, especially where hygiene and sanitation are inadequate. A child walking barefoot can pick up hookworm; by putting a dirty finger in her mouth, she may ingest roundworm eggs. It is not uncommon for a child to carry up to 1,000 hookworms, roundworms and whipworms that deplete blood and nutrients.

Overall, about 1.5 billion people have roundworms, making it the third most common human infection in the world. Whipworm infects 1 billion people, including nearly one third of all children in Africa. More than 1.3 billion people carry hookworm in their gut, and 265 million people are infected with schistosomes, the parasites that cause the debilitating disease of schistosomiasis.

Worms affect nutrition in several ways, ingesting blood and leading to the loss of iron and other nutrients. Worms also cause the lining of the intestines to change, which reduces the surface membrane available for digestion and absorption. As a result, fat, certain carbohydrates, proteins and several vitamins (including vitamin A) are not absorbed properly. Lactose intolerance and poor use of available iron can also result.

Treatment is simple and relatively inexpensive. A single dose of anti-worm medicine such as Mebendazole costs as little as 3 cents and can eliminate or significantly reduce intestinal worm infections. The total cost of treatment programmes is typically $1 to $2 per year per person. Controlled experiments in India, Indonesia, Malaysia, Myanmar and Tanzania have proved that the therapy works for months at a time. UNICEF, WHO and the World Bank have identified pre-school and school-age children, women of childbearing age and adolescent girls as those who would benefit most from worm control programmes.

The benefits are impressive. An innovative study in Kenya in 1994, which used motion detectors on the thighs of school children, found that ridding the youngsters of high levels of hookworm improved physical activity. Dewormed children reported better appetites and an end to abdominal pains and headaches. Within nine weeks, the treated group showed better growth, weight gain (both in

terms of fat deposits and muscle mass), physical activity and appetite than the untreated group. Numerous studies have also noted the mental and cognitive effects of anaemia in children infected with worms, with intellectual performance improving after treatment.

In a large-scale study done in India in 1996, two groups of children ages one to four years received twice-yearly vitamin A supplements; one group was also given deworming tablets. At the end of the trial, the children in the group given worm treatment were on average 1 kg heavier than the children who were not treated. The study shows not only that mass deworming can improve the weights of young children in areas where worms are common, but it also opens up the practical possibility of combining worm treatment with vitamin A supplementation in areas at risk.

Some believe that deworming is not a satisfactory solution because it must be repeated in the absence of improved sanitation, hygiene and health education, and reinfection occurs frequently. Nevertheless, periodic deworming reduces helminths' drain on children's development at critical times in their lives, at least until the causes and conditions of environmental contamination and infection are successfully addressed.

Photo: One of the most common infections in the world, worms impede children's growth and cause anaemia. Learning and memory suffer. Here, a girl attends school in India.

ing interaction with parents and peers. The parents of young children everywhere need regular contact with people who can help check their children's growth and development and can provide advice and support on breastfeeding and complementary feeding. In many communities, parents and caregivers will also need both advice on and access to supplements of vitamin A, iron, iodine and other micronutrients. Support in these areas might best be provided through established formal institutions — health centres, clinics or pre-school centres (Panel 21). But where such facilities do not exist or do not function, children cannot wait for them to be built or staffed.

Communities must receive overall support in their efforts to ensure that all families have access to basic preventive actions to improve the nutrition of children and pregnant women. This includes strengthened health services to prevent and treat disease, and increased support to stimulate early child learning, care and development.

None of the preventive and supportive actions to promote child growth and development described in this report require a doctor or nurse or a trained educator. Communities can be helped to organize themselves to provide or administer these services, and in most communities, groups that can take on these responsibilities already exist. Communities can also be helped to assess their own priority problems and can learn to monitor the effectiveness of their actions, redesigning their own programmes accordingly. Combined with the use of effective low-cost technologies, the adoption of these measures could result in rapid improvements not only in child survival but also in child development, nutritional status and learning capacity.

A girl enjoys an ear of corn in the United States, where researchers have developed a new strain of corn that increases the body's ability to absorb iron.

Panel 21

Child nutrition a priority for the new South Africa

UNICEF/South Africa

Under apartheid, South Africa had a highly sophisticated medical research infrastructure that served the white minority, pioneering heart transplants, for example. Yet the majority of the people were left with poor health and nutrition care. The advent of democratic rule in 1994, however, changed all that. The Government is now reorienting the health system to the needs of the majority, and child nutrition is a priority.

Establishing a community-level nutrition monitoring system is an important part of this effort, and one area where this approach is taking shape is the Bergville district of KwaZulu-Natal Province. Child health and nutrition problems in the province are among the most challenging in the country. Over half the children live in poverty, nearly 40 per cent have vitamin A deficiency, up to one quarter of the children in rural areas are stunted, and iodine deficiency is a problem in mountainous areas. Ten per cent of children ages six months to five years suffer from anaemia, which is also prevalant among pregnant women, and low birthweight is common.

In the Bergville district, with a population of 120,000, a network of community health workers and health assistants is being trained as part of the new Child Survival Programme. The approach, based on regular weighing of young children in their homes to monitor growth, is similar to that used successfully in other developing countries during the past decade. Health workers will use the weighing sessions to discuss children's growth with their families, reinforcing positive trends and exploring reasons behind faltering growth to devise solutions. To carry out the programme, the number of community health workers in the district will be expanded significantly. The main objective is to cover all families, including the poorest and most marginalized.

Community participation in planning and operating health services is at the core of the programme. Community members formed a health forum in 1994, which serves as the steering committee of the Child Survival Programme. The group has helped establish a district hospital board and local committees to supervise health workers and has organized workshops on the new programme.

Since 1996, resources for health care have been channelled more equitably to disadvantaged provinces such as KwaZulu-Natal, and this will help finance the improved health services. The University of Natal in Pietermaritzburg is taking a leading role in supporting child growth monitoring in the Bergville district. In addition, World Vision of South Africa, an NGO which has been active in the district since 1980, has helped lay the groundwork for the programme through various community development projects. These include local leadership training, skills training for women's groups, support for a preschool and crèche programme and cooperation with the health service in addressing malnutrition.

The new system for monitoring growth is sorely needed, according to a recent survey, which found that while most mothers had a health services card for monitoring child growth, many of the cards were either left

blank or were incomplete. The survey also found that very little nutritional counselling had accompanied growth monitoring.

The new programme faces many difficulties: Resources are stretched, personnel must be trained and there must be outreach into communities. Nonetheless, the new partnerships being forged between government, the university, NGOs and communities represent an approach that holds promise for the future.

A major effort to tackle vitamin A deficiency is also under way. Within months after the new Government took office, the South African Vitamin A Consultative Group launched the country's largest-ever nutrition survey, covering nearly 20,000 households. The survey found that one third of children ages six months to five years are vitamin A deficient or on the borderline. The Government and non-governmental partners are gearing up to address the problem. Steps planned include giving vitamin A supplements to young children and to mothers shortly after giving birth, fortifying staple foods with vitamin A and encouraging the production and consumption of vitamin A-rich foods.

Photo: In South Africa, community health workers weigh children and discuss growth promotion with their families.

It has often been said that meeting this challenge is a matter of political will. In a $28 trillion global economy, the problem is surely not a lack of resources. But it may be more useful to see the challenge as a matter of political choice. Governments in poor and rich countries alike may choose to allow children to be intellectually disabled, physically stunted and vulnerable to illness in childhood and later life. This is the price of doing little or nothing to ensure good nutrition.

But governments could instead resolve to move to consolidate lessons already learned about reducing malnutrition. They could do everything possible to mount massive actions that can clearly succeed and that can be implemented by communities themselves. And they could encourage research on, and implementation of, new and better actions.

For the well-being and protection of children and the human development of the world, the course of action is clear.

Governments could instead resolve to move to consolidate lessons already learned about reducing malnutrition. They could do everything possible to mount massive actions that can clearly succeed and that can be implemented by communities themselves.

References

The silent emergency

1. Gillespie, Stuart, 'Increased Maternal Mortality Risk', section 5.1 in *Major Issues in Developing Effective Approaches for the Prevention and Control of Iron Deficiency: An overview prepared for the Micronutrient Initiative and UNICEF*, work in progress, September 1996 (first draft).

2. Draper, Alizon, 'Child Development and Iron Deficiency: Early action is critical for healthy mental, physical and social development', The Oxford Brief, Opportunities for Micronutrient Interventions, Washington, D.C., May 1997.

3. World Bank, *World Development Report 1993: Investing in health*, Oxford University Press, Washington, D.C., 1993, p. 77, col. 1.

4. World Bank, *Enriching Lives: Overcoming vitamin and mineral malnutrition in developing countries*, World Bank, Washington, D.C., 1994, p. 2; 'Total GDP Table 1995', *World Development Indicators 1997* (CD-ROM), International Bank for Reconstruction and Development/ World Bank, Washington, D.C., 1997.

5. Draper, Alizon, op. cit., p. 1.

6. Maberly, Glenn F., 'Iodine Deficiency in Georgia: Progress towards elimination, Summary Report', The Program Against Micronutrient Malnutrition, Atlanta, April-May 1997, p. 1, col. 3.

7. Martorell, Reynaldo, 'The Role of Nutrition in Economic Development', *Nutrition Reviews*, Vol. 54, No. 4, April 1996, p. S70.

8. In accordance with international terminology recommended by WHO, readings that are three or more standard deviations from the reference median (based on a reference population of American children) are referred to as 'severely malnourished', while those between two and three standard deviations are called 'moderately malnourished'.

9. Young, Helen and Susanne Jaspars, *Nutrition Matters: People, food and famine*, Intermediate Technology Publications, London, 1995, p. 17.

10. UNICEF, 'Food, Health and Care', UNICEF, New York, updated edition, November 1996, p. 13.

11. Draper, Alizon, op cit., p. 1.

12. *What Governments Can Do: Seventh annual report on the state of world hunger*, Bread for the World Institute, Silver Spring, 1997, p. 8.

13. Ibid., p. 10.

14. Philip, W. et al., 'The contribution of nutrition to inequalities in health', *British Medical Journal*, Vol. 314, British Medical Association, London, 24 May 1997, p. 1545.

15. 'Children at Risk in Central and Eastern Europe: Perils and promises', Economies in Transition Studies, Regional Monitoring Report, No. 4, UNICEF, International Child Development Centre, Florence, 1997, p. 43.

16. Fogel, Robert W., 'Economic Growth, Population Theory and Physiology: The bearing of long-term processes on the making of economic policy', *The American Economic Review*, Vol. 84, No. 3, The American Economic Association, Nashville, June 1994, pp. 369-395.

17. Grantham-McGregor, Sally, 'A Review of Studies of the Effect of Severe Malnutrition on Mental Development', *The Journal of Nutrition*, Supplement, Vol. 125, No. 8S, The American Institute of Nutrition, Bethesda, 1995, p. 2235S.

18. Cole, Michael and Sheila R. Cole, 'Prenatal Development', *The Development of Children*, Scientific American Books, New York and Oxford, 1989, p. 72.

19. Nash, Madeleine J., 'Fertile Minds', Special Report, *Time*, Vol. 149, No. 5, 3 February 1997, p. 52.

20. Landers, Cassie, 'A Theoretical Basis for Investing in Early Child Development: Review of current concepts', *Innocenti Global Seminar on Early Child Development*, UNICEF International Child Development Centre, Florence, 1989, p. 4.

21. Hanson, Lars A. et al., 'Effects of breastfeeding on the baby and on its immune system', *Food and Nutrition Bulletin*, Vol. 17, No. 4, United Nations University Press, Tokyo, December 1996, p. 384.

22. De Zoysa, I., M. Rea and J. Martines, 'Why promote breastfeeding in diarrhoeal disease control programmes?', *Health Policy Planning*, Oxford University Press, 1991, 6:371-379, as cited in 'A warm chain for breastfeeding', *The Lancet*, Vol. 344, No. 8932, 5 Nov. 1994, p. 1239.

23. Glick, Daniel, 'Rooting for Intelligence,' *Newsweek*, Special Edition, Newsweek, New York, Spring/Summer 1997, p. 32.

24. UNDP, *Human Development Report 1997*, UNDP, New York, pp. 164-165.

25. UNICEF, *WATERfront*, Issue 8, UNICEF, New York, August 1996, p. 16.

26. UNDP, *Human Development Report 1997*, p. 29.

27. United Nations, Progress made in providing safe water supply and sanitation for all during the first half of the 1990s: Report of the Secretary-General, United Nations, New York, A/50/213-E/1995/87, 8 June 1995, table 1, p. 5.

28. UNICEF, *The Progress of Nations 1997*, p. 12.

29. US Department of Agriculture study (1990) cited in Tufts University, School of Nutrition, Center on Hunger, Poverty and Nutrition Policy, 'Statement on the Link Between Nutrition and Cognitive Development in Children', 1995, p. 8.

30. Landers, op. cit., p. 7.

31. United Nations, *The World's Women 1995: Trends and statistics*, Social Statistics and Indicators, Series K, No.12, United Nations, New York, 1995, p. 108.

32. Holmboe-Ottesen, Gerd, Ophelia Mascarenhas and Margareta Wandel, 'Women's Role in Food Chain Activities and the Implications for Nutrition', ACC/SCN State-of-the-Art Series, Nutrition Policy Discussion Paper No. 4, United Nations, New York, May 1989, p. 37.

Approaches that work

1. Gillespie, Stuart, John Mason and Reynaldo Martorell, 'How Nutrition Improves', ACC/SCN State-of-the-Art Series, Nutrition Policy Discussion Paper No. 15, United Nations, New York, July 1996.

2. 'International Code of Marketing of Breastmilk Substitutes', World Health Organization, Geneva, 1981, pp. 6-7.

3. UNICEF, *The Progress of Nations 1997*, UNICEF, New York, 1997, p. 21.

4. Micronutrient Initiative, Ottawa, facsimile dated 14 Oct. 1997.

5. Sommer, Alfred et al., 'Impact of vitamin A supplementation on childhood mortality: A randomised controlled community trial', *The Lancet*, 1986, Vol. 1, pp. 1169-1173.

6. Beaton, G. H. et al., 'Effectiveness of Vitamin A Supplementation in the Control of Young Child Morbidity and Mortality in Developing Countries', ACC/SCN State-of-the-Art Series, Nutrition Policy Discussion Paper No. 13, United Nations, December 1993, p. 61.

7. Ross, David A. et al., 'Vitamin A supplementation in northern Ghana: Effects on clinic attendances, hospital admissions and child mortality', *The Lancet*, Vol. 342, 3 July 1993, pp. 7-12.

8. Katz, J. et al., 'Night blindness is prevalent during pregnancy and lactation in rural Nepal', Department of International Health, Johns Hopkins School of Hygiene and Public Health, Baltimore, *Journal of Nutrition*, August 1995.

9. Gillespie, Stuart, John Kevany and John Mason, 'Controlling Iron Deficiency: A report based on an ACC/SCN workshop', United Nations, Geneva, February 1991, p. 4.

10. Alnwick, David, 'More for Less in Combating Iron Deficiency? Update on the Effectiveness of Weekly Supplements', *Research in Action*, No. 2, UNICEF, New York, November 1995, p. 1; Schultink, W. et al., 'Effect of daily vs. twice weekly iron supplementation in Indonesian preschool children with low iron status', *American Journal of Clinical Nutrition*, Vol. 61, American Society for Clinical Nutrition, 1995, pp. 111-115.

11. Layrisse, M. et al., 'Early response to the effect of iron fortification in the Venezuelan population', *American Journal of Clinical Nutrition*, Vol. 64, 1996, pp. 905-906.

12. Stoltzfus, R. J. et al., 'Epidemiology iron deficiency in Zanzibari schoolchildren: The importance of hookworms', *American Journal of Clinical Nutrition*, Vol. 65, 1997, p. 157.

13. United Nations, Progress at Mid-Decade on Implementation of General Assembly resolution 45/217 on the World Summit for Children: Report of the Secretary-General, United Nations, New York, A/51/256, 26 July 1996, p. 30, para. 130.

14. Lewnes, Alexia, *Oral Rehydration Therapy: Elixir of life*, UNICEF, New York, February 1997, p. 3.

Bringing science to bear

1. Piot, Peter, 'Fighting AIDS together', *The Progress of Nations 1997*, UNICEF, New York, 1997, p. 23.

2. Sommer, Alfred and Keith P. West, Jr., *Vitamin A Deficiency: Health, survival and vision*, Oxford University Press, New York and Oxford, 1996, pp. 41, 48, 66-70.

3. Roy, S. K. et al., 'Impact of a single megadose of vitamin A at delivery on breastmilk of mothers and morbidity of their infants', *European Journal of Clinical Nutrition*, No. 51, Stockton Press, 1997.

4. 'Zinc for Child Health: Child Health Research Project Special Report', Report of a meeting, Baltimore, Maryland, 17-19 Nov. 1996, Vol. 1, No. 1, June 1997, p. 8.

5. 'Improving Iron and Zinc Nutrition in Infancy and Early Childhood: Proceedings of the Bali Consultation Meeting for the Planning of Multi-Country Iron and Zinc Intervention Trials', in Bali, Indonesia, 4-6 February 1997, UNICEF, 1997, pp. 6-7.

6. Semba, Richard D., 'Will vitamin A supplementation reduce mother-to-child transmission of HIV?' *Research in Action*, No. 5, UNICEF, New York, July 1996.

7. Adamson, Peter, 'A failure of imagination', *The Progress of Nations 1996*, UNICEF, New York, 1996, p. 8.

8. Rasmussen, Kathleen M. and Michelle K. McGuire, 'Effects of breastfeeding on maternal health and well-being', *Food and Nutrition Bulletin*, Vol. 17, No. 4, United Nations University Press, 1996, p. 366.

9. Murray, Christopher J. L. and Alan D. Lopez (eds.), *The Global Burden of Disease*, Harvard School of Public Health, Cambridge, 1996, pp. 360-367.

10. Barker, David J. P., *Mothers, Babies and Disease in Later Life*, BMJ Publishing, London, 1994.

11. Law, Catherine M. and Alistair W. Shiell, 'Is blood pressure inversely related to birth weight? The strength of evidence from a systematic review of the literature', *Journal of*

BEST COPY AVAILABLE

Hypertension, Vol. 14, No. 8, 1996, pp. 935-941.

12. Law, C. M. et al., 'Thinness at birth and glucose tolerance in seven-year-old children', *Diabetic Medicine*, 1995, 12:24-29.

13. Hales, C. N. et al., 'Fetal and infant growth and impaired glucose tolerance at age 64', *British Medical Journal*, Vol. 303, 26 Oct. 1991, pp. 1019-1022; Phipps, K. et al., 'Fetal growth and impaired glucose tolerance in men and women, *Diabetologia*, 1993, 36:225-228; McCance, David R. et al., 'Birth weight and non-insulin dependent diabetes: Thrifty genotype, thrifty phenotype, or surviving small baby genotype?', *British Medical Journal*, Vol. 308, 1994, pp. 942-945.

14. Barker, op. cit.; Hales, C. N. and D. J. P. Barker, 'Type 2 (non-insulin dependent) diabetes mellitus: The thrifty phenotype hypothesis', *Diabetologia*, 1992, 35:595-601.

15. *The Smallest Babies in the World*, video, MRC Environmental Epidemiology Unit, Southampton, 1996.

16. A study of maternal nutrition and intrauterine fetal growth, *King Edward Memorial Hospital Research Centre Annual Report 1995-1996*, KEMHRC, Pune, 1996, p. 36.

17. 'Proceedings of the Third Annual Workshop on the Fetal and Early Origins of Adult Disease', meeting in Khandala, Maharashtra, India, September 1996, p. 6.

18. Fall, Caroline, Ranjan Yajnik and Shobha Rao, personal communication, 1997.

19. McKeigue, P. M., G. J. Miller and M. G. Marmot, 'Coronary heart disease in South Asians overseas: A review', *Journal of Clinical Epidemiology*, Vol. 42, No. 7, United Kingdom, 1989, pp. 597-609.

20. Among 201 four-year-old children born in Pune of known birthweight, those who were 2.4 kg or less at birth had mean glucose and insulin concentrations 8.1 mM (micromole) and 321 pM (picamole) respectively 30 minutes after an oral glucose challenge; in comparison children born 3.0 kg or heavier had a mean glucose concentration of 7.5 mM and a mean blood insulin level of 289 pM. From Yajnik, M. et al., 'Fetal growth and glucose and insulin metabolism in four-year-old Indian children', *Diabetic Medicine*, Vol. 12, 1995, pp. 330-336.

21. Congdon, N. et al., 'Pupillary and visual thresholds in young children as an index of population vitamin A status', *American Journal of Clinical Nutrition*, Vol. 61, The American Society of Clinical Nutrition, May 1995, pp. 1076-1082; Sanchez, A. M. et al., 'Pupillary threshold as an index of population vitamin A status among children in India', *American Journal of Clinical Nutrition*, Vol. 65, January 1997, pp. 61-66.

22. Mendoza, C. et al., 'Effect of Genetically Modified, Low-Phytate Maize on Iron Absorption from Tortillas', article submitted to *Experimental Biology '97* (unpublished).

Chapter II

Statistical tables

Economic and social statistics on the nations of the world, with particular reference to children's well-being.

GENERAL NOTE ON THE DATA PAGE 92
EXPLANATION OF SYMBOLS PAGE 92
UNDER-FIVE MORTALITY RANKINGS PAGE 93
REGIONAL SUMMARIES COUNTRY LIST PAGE 122
GLOSSARY PAGE 131

Tables

1 BASIC INDICATORS PAGE 94
2 NUTRITION PAGE 98
3 HEALTH PAGE 102
4 EDUCATION PAGE 106
5 DEMOGRAPHIC INDICATORS PAGE 110
6 ECONOMIC INDICATORS PAGE 114
7 WOMEN PAGE 118
8 THE RATE OF PROGRESS PAGE 124

General note on the data

Four major changes have been made to the statistical tables in *The State of the World's Children 1998* report.

First, the less populous countries, which were previously presented in a separate table, have been merged into the main tables. Each of the eight tables now lists 193 countries.

Second, only independent, sovereign countries are listed; these include all countries that are members of the United Nations and all countries that have ratified the Convention on the Rights of the Child.

Third, countries are now listed alphabetically in each table rather than in descending order of their under-five mortality rate (U5MR). However, because this rate is a crucial indicator, countries ranked in order of their U5MR are listed on the page opposite this note. Every table also includes a column providing the U5MR rank of each country. The index to countries, which appeared before table 1 in previous reports, has been eliminated.

Fourth, the regional summary for each table now appears with its relevant table.

The data presented in these tables are accompanied by definitions, sources and explanations of symbols. The tables are derived from many sources and thus will inevitably contain a wide range of data quality. Official government data received by the responsible United Nations agency have been used whenever possible. In the many cases where there are no reliable official figures, estimates made by the responsible United Nations agency have been used. Where such internationally standardized estimates do not exist, the tables draw on other sources, particularly data received from the appropriate UNICEF field office. Where possible, only comprehensive or representative national data have been used.

Data quality is likely to be adversely affected for countries that have recently suffered from man-made or natural disasters. This is particularly so where basic country infrastructure has been fragmented or major population movements have occurred.

Data for life expectancy, total fertility rate, crude birth and death rates, etc. are part of the regular work on estimates and projections undertaken by the United Nations Population Division. These and other internationally produced estimates are revised periodically, which explains why some of the data will differ from those found in earlier UNICEF publications.

In addition, the statistical tables in the present report contain new data from recent Multiple Indicator Cluster Surveys. These surveys were carried out in 1995 and 1996 by more than 60 countries worldwide as a means of assessing the progress made for children in the context of the goals of the World Summit for Children.

Two new indicators have also been introduced. 'Per cent of routine EPI vaccines financed by government', the first of these new indicators, appears in table 3. This indicator reflects a country's capacity to immunize children as an integral part of its health care system. It replaces the previous indicator entitled 'per cent of population with access to health services', which although of interest to many has been eliminated because of the poor quality of the data.

'Per cent of population below $1 per day', the second new indicator, can be found in table 6. This indicator is now used by the World Bank and is a more explicit monetary measure of international poverty than the indicator it replaces. Previous reports defined absolute poverty as the income level below which a minimum nutritionally adequate diet, plus essential non-food requirements, was not affordable.

Explanation of symbols

Since the aim of this statistics chapter is to provide a broad picture of the situation of children and women worldwide, detailed data qualifications and footnotes are seen as more appropriate for inclusion elsewhere. Only three symbols are used to classify the table data.

- Indicates data are not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

y Indicates that survey data were used for estimating net primary school enrolment (in table 4 only).

Under-five mortality rankings

The following list ranks countries in descending order of their estimated 1996 under-five mortality rate (U5MR). Countries are listed alphabetically in the tables that follow.

Country	U5MR rate	U5MR rank
Niger	320	1
Angola	292	2
Sierra Leone	284	3
Afghanistan	257	4
Liberia	235	5
Guinea-Bissau	223	6
Mali	220	7
Malawi	217	8
Mozambique	214	9
Somalia	211	10
Guinea	210	11
Congo, Dem. Rep.	207	12
Zambia	202	13
Nigeria	191	14
Mauritania	183	15
Ethiopia	177	16
Burundi	176	17
Equatorial Guinea	173	18
Cambodia	170	19
Rwanda	170	19
Central African Rep.	164	21
Madagascar	164	21
Burkina Faso	158	23
Djibouti	157	24
Côte d'Ivoire	150	25
Myanmar	150	25
Chad	149	27
Gabon	145	28
Tanzania	144	29
Uganda	141	30
Benin	140	31
Lesotho	139	32
Pakistan	136	33
Haiti	134	34
Lao People's Dem. Rep.	128	35
Bhutan	127	36
Senegal	127	36
Togo	125	38
Comoros	122	39
Iraq	122	39
Eritrea	120	41
Nepal	116	42
Sudan	116	42
Bangladesh	112	44
Papua New Guinea	112	44
India	111	46
Ghana	110	47
Congo	108	48
Gambia	107	49
Yemen	105	50
Bolivia	102	51
Cameroon	102	51
Swaziland	97	53
Marshall Islands	92	54
Kenya	90	55
Guyana	83	56
Sao Tome and Principe	80	57
Egypt	78	58
Turkmenistan	78	58
Namibia	77	60
Kiribati	76	61
Maldives	76	61
Tajikistan	76	61
Morocco	74	64
Cape Verde	73	65
Zimbabwe	73	65
Indonesia	71	67
Mongolia	71	67
South Africa	66	69
Libya	61	70
Uzbekistan	60	71
Peru	58	72
Nicaragua	57	73
Dominican Rep.	56	74
Guatemala	56	74
Tuvalu	56	74
Samoa	53	77
Vanuatu	53	77
Brazil	52	79
Botswana	50	80
Kyrgyzstan	50	80
China	47	82
Turkey	47	82
Kazakstan	45	84
Azerbaijan	44	85
Belize	44	85
Viet Nam	44	85
Albania	40	88
Ecuador	40	88
El Salvador	40	88
Lebanon	40	88
Algeria	39	92
Philippines	38	93
Saint Kitts and Nevis	38	93
Thailand	38	93
Iran	37	96
Honduras	35	97
Palau	35	97
Tunisia	35	97
Paraguay	34	100
Syria	34	100
Mexico	32	102
Moldova, Rep. of	32	102
Colombia	31	104
Grenada	31	104
Nauru	31	104
Suriname	31	104
Armenia	30	108
Cook Islands	30	108
Korea, Dem. People's Rep.	30	108
Saudi Arabia	30	108
TFYR Macedonia	30	108
Georgia	29	113
Solomon Islands	29	113
Venezuela	28	115
Micronesia, Fed. States of	27	116
Argentina	25	117
Jordan	25	117
Romania	25	117
Russian Federation	25	117
Fiji	24	121
Ukraine	24	121
Bahamas	23	123
Mauritius	23	123
Saint Vincent/Grenadines	23	123
Tonga	23	123
Antigua and Barbuda	22	127
Bahrain	22	127
Saint Lucia	22	127
Uruguay	22	127
Yugoslavia, Fed. Rep.	22	127
Qatar	21	132
Dominica	20	133
Latvia	20	133
Panama	20	133
Bulgaria	19	136
Seychelles	19	136
Sri Lanka	19	136
Belarus	18	139
Lithuania	18	139
Oman	18	139
United Arab Emirates	18	139
Bosnia and Herzegovina	17	143
Trinidad and Tobago	17	143
Estonia	16	145
Costa Rica	15	146
Kuwait	14	147
Poland	14	147
Chile	13	149
Malaysia	13	149
San Marino	13	149
Barbados	12	152
Hungary	12	152
Brunei Darussalam	11	154
Croatia	11	154
Jamaica	11	154
Malta	11	154
Slovakia	11	154
Cuba	10	159
Cyprus	10	159
Greece	9	161
Israel	9	161
United States	8	163
Belgium	7	164
Canada	7	164
Czech Rep.	7	164
Ireland	7	164
Italy	7	164
Korea, Rep. of	7	164
Liechtenstein	7	164
Luxembourg	7	164
New Zealand	7	164
Portugal	7	164
United Kingdom	7	164
Andorra	6	175
Australia	6	175
Austria	6	175
Denmark	6	175
France	6	175
Germany	6	175
Japan	6	175
Monaco	6	175
Netherlands	6	175
Norway	6	175
Slovenia	6	175
Iceland	5	186
Spain	5	186
Switzerland	5	186
Finland	4	189
Singapore	4	189
Sweden	4	189
Holy See	no data	
Niue	no data	

Table 1: Basic indicators

	Under-5 mortality rank	Under-5 mortality rate 1960	Under-5 mortality rate 1996	Infant mortality rate (under 1) 1960	Infant mortality rate (under 1) 1996	Total population (thousands) 1996	Annual no. of births (thousands) 1996	Annual no. of under-5 deaths (thousands) 1996	GNP per capita (US$) 1995	Life expectancy at birth (years) 1996	Total adult literacy rate 1995	Primary school enrolment ratio (gross) 1990-95	% share of household income 1990-96 lowest 40%	% share of household income 1990-96 highest 20%
Afghanistan	4	360	257	215	165	20883	1127	290	250x	45	32	48		
Albania	88	151	40	112	34	3401	75	3	670	71		98		
Algeria	92	255	39	152	34	28784	857	33	1600	68	62	105	18x	46x
Andorra	175		6		5	71	1	0	c					
Angola	2	345	292	208	170	11185	546	159	410	47	42x	88		
Antigua and Barbuda	127		22		18	66	1	0	6980x	75	95x	100x		
Argentina	117	72	25	60	22	35219	709	18	8030	73	96	111		
Armenia	108	48	30	38	25	3638	50	2	730	71	100	90		
Australia	175	24	6	20	6	18057	262	2	18720	78		107	16x	42x
Austria	175	43	6	37	5	8106	86	0	26890	77		103		
Azerbaijan	85	75	44	55	34	7594	154	7	480	71	100	117		
Bahamas	123	68	23	51	19	284	5	0	11940	73	98	97		
Bahrain	127	203	22	130	18	570	12	0	7840	73	85	111		
Bangladesh	44	247	112	151	83	120073	3186	357	240	57	38	79	23	38
Barbados	152	90	12	74	11	261	3	0	6560	76	97	90		
Belarus	139	47	18	37	14	10348	106	2	2070	70	99	97	26	33
Belgium	164	35	7	31	6	10159	115	1	24710	77		99	22x	36x
Belize	85	104	44	74	36	219	7	0	2630	74	80x	111		
Benin	31	310	140	184	84	5563	238	33	370	54	37	72		
Bhutan	36	300	127	175	90	1812	76	10	420	52	42	25x		
Bolivia	51	252	102	152	71	7593	258	26	800	61	83	95	15	48
Bosnia and Herzegovina	143	155	17	105	15	3628	43	1	a	73				
Botswana	80	170	50	117	40	1484	52	3	3020	52	70	115	11x	59x
Brazil	79	177	52	115	44	161087	3211	167	3640	67	83	114	7x	68x
Brunei Darussalam	154	87	11	63	9	300	6	0	25160	75	88	109		
Bulgaria	136	70	19	49	16	8468	86	2	1330	71	98	86	21	39
Burkina Faso	23	318	158	183	82	10780	501	79	230	46	19	39		
Burundi	17	255	176	151	106	6221	272	48	160	46	35	69		
Cambodia	19	217	170	146	108	10273	360	61	270	53	65x	118		
Cameroon	51	264	102	156	63	13560	539	55	650	56	63	89		
Canada	164	33	7	28	6	29680	367	2	19380	79	97x	103	18x	40x
Cape Verde	65	164	73	110	54	396	12	1	960	66	72	131		
Central African Rep	21	343	164	195	103	3344	127	21	340	49	60	71x		
Chad	27	325	149	195	92	6515	275	41	180	47	48	55		
Chile	149	138	13	107	11	14421	294	4	4160	75	95	99	10	61
China	82	209	47	140	38	1232083	20712	973	620	69	82	118	15	38
Colombia	104	130	31	82	26	36444	878	27	1910	71	91	121	11	56
Comoros	39	248	122	165	83	632	26	3	470	57	57	75		
Congo	48	220	108	143	81	2668	115	12	680	51	75			
Congo, Dem. Rep.	12	302	207	175	128	46812	2135	442	120	53	77	68		
Cook Islands	108		30		26	19	0	0	1550x		99x	98		
Costa Rica	146	112	15	80	13	3500	86	1	2610	77	95	106	13x	51x
Côte d'Ivoire	25	300	150	195	90	14015	523	78	660	51	40	68	18x	44x
Croatia	154	98	11	70	10	4501	48	1	3250	72	98	86		
Cuba	159	54	10	39	10	11018	149	2	1170x	76	96	104		
Cyprus	159	36	10	30	9	756	12	0	10260x	77	94x	100		
Czech Rep.	164	25	7	22	6	10251	111	1	3870	73		100	24	37
Denmark	175	25	6	22	6	5237	68	0	29890	75		99	17x	34x
Djibouti	24	289	157	186	112	617	24	4	780x	50	46	38		
Dominica	133		20		17	71	2	0	2990	73				
Dominican Rep.	74	149	56	102	45	7961	198	11	1460	71	82	103	12x	56x
Ecuador	88	180	40	115	31	11699	309	12	1390	70	90	123	14	53
Egypt	58	282	78	189	58	63271	1690	132	790	65	51	98	21	41
El Salvador	88	210	40	130	34	5796	166	7	1610	69	72	79		
Equatorial Guinea	18	316	173	188	111	410	17	3	380	49	79	149x		
Eritrea	41	250	120	170	78	3280	135	16	100x	50		49		
Estonia	145	52	16	40	13	1471	13	0	2860	69	98	101	17	46
Ethiopia	16	280	177	175	113	58243	2856	506	100	49	36	27	21x	41x

96

	Under-5 mortality rank	Under-5 mortality rate 1960	Under-5 mortality rate 1996	Infant mortality rate (under 1) 1960	Infant mortality rate (under 1) 1996	Total population (thousands) 1996	Annual no. of births (thousands) 1996	Annual no. of under-5 deaths (thousands) 1996	GNP per capita (US$) 1995	Life expectancy at birth (years) 1996	Total adult literacy rate 1995	Primary school enrolment ratio (gross) 1988-96	% share of household income 1988-96 lowest 40%	% share of household income 1988-96 highest 20%
Fiji	**121**	97	**24**	71	20	797	18	0	2440	72	92	128	-	-
Finland	**189**	28	**4**	22	4	5126	62	0	20540	76		100	18x	36x
France	**175**	34	**6**	29	5	58333	692	4	24990	79		105	17x	42x
Gabon	**28**	297	**145**	171	87	1106	41	5	3490	55	63	-	-	-
Gambia	**49**	375	**107**	213	78	1141	46	5	320	46	35	67	-	-
Georgia	**113**	70	**29**	52	23	5442	77	2	440	73	99	82	-	-
Germany	**175**	40	**6**	34	5	81922	774	4	27510	76		97	19x	40x
Ghana	**47**	213	**110**	126	70	17832	692	76	390	57	65	76	20	42
Greece	**161**	64	**9**	53	8	10490	104	1	8210	78	97	95	-	-
Grenada	**104**		**31**		25	92	2	0	2980		95x	88x	-	-
Guatemala	**74**	204	**56**	140	43	10929	405	23	1340	66	56	84	8x	63x
Guinea	**11**	360	**210**	215	130	7518	359	75	550	46	36	46	11	50
Guinea-Bissau	**6**	336	**223**	200	132	1091	44	10	250	44	55	60x	9	59
Guyana	**56**	126	**83**	100	60	838	19	2	590	64	98	112x	-	-
Haiti	**34**	260	**134**	170	94	7259	250	34	250	54	45	56	-	-
Holy See	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Honduras	**97**	204	**35**	137	29	5816	201	7	600	69	73	112	11	57
Hungary	**152**	57	**12**	51	11	10049	104	1	4120	69	99	97	24	37
Iceland	**186**	22	**5**	17	5	271	4	0	24950	78		98	-	-
India	**46**	236	**111**	144	73	944580	24381	2708	340	62	52	102	21	43
Indonesia	**67**	216	**71**	127	47	200453	4732	336	980	64	84	115	21	41
Iran	**96**	233	**37**	145	33	69975	2446	87	1833x	69	69	101	-	-
Iraq	**39**	171	**122**	117	94	20607	770	94	1036x	61	58	91	-	-
Ireland	**164**	36	**7**	31	6	3554	46	0	14710	76		104		
Israel	**161**	39	**9**	32	8	5664	115	1	15520	77	95x	95	18x	40x
Italy	**164**	50	**7**	44	6	57226	529	4	19020	79	98	98	19x	41x
Jamaica	**154**	76	**11**	58	10	2491	56	1	1510	74	85	109	16	48
Japan	**175**	40	**6**	31	4	125351	1291	8	39640	80		102	22x	36x
Jordan	**117**	139	**25**	97	21	5581	211	5	1510	69	87	94	16	50
Kazakstan	**84**	74	**45**	55	38	16820	312	14	1330	65	100	87	20	40
Kenya	**55**	202	**90**	120	61	27799	1027	92	290	54	78	91	10	62
Kiribati	**61**		**76**		56	80	2	0	920	59	93x	91	-	-
Korea, Dem. People's Rep.	**108**	120	**30**	85	23	22466	493	15	970x	72		104x	-	-
Korea, Rep. of	**164**	127	**7**	90	6	45314	698	5	9700	77	98	95	20x	40x
Kuwait	**147**	128	**14**	89	13	1687	40	1	17390	76	79	69	-	-
Kyrgyzstan	**80**	115	**50**	80	39	4469	117	5	700	68	97	111	10	57
Lao People's Dem. Rep.	**35**	226	**128**	155	102	5035	227	29	350	53	57	107	23	40
Latvia	**133**	44	**20**	35	16	2504	25	1	2770	69	100	83	23	37
Lebanon	**88**	85	**40**	65	33	3084	76	3	2660	69	92	112	-	-
Lesotho	**32**	203	**139**	137	96	2078	74	10	700	54	71	99	9x	60x
Liberia	**5**	298	**235**	190	157	2245	121	28	490x	48	38	35x	-	-
Libya	**70**	269	**61**	160	50	5593	227	14	6540x	65	76	110	-	-
Liechtenstein	**164**	-	**7**	-	6	31	0	0	-	-	100x	-	-	-
Lithuania	**139**	70	**18**	52	14	3728	41	1	1900	72	99	96	20	42
Luxembourg	**164**	41	**7**	33	7	412	5	0	41210	76		91	-	-
Madagascar	**21**	364	**164**	219	100	15353	643	105	230	58	84	73	16	50
Malawi	**8**	365	**217**	206	137	9845	487	106	170	41	58	120		
Malaysia	**149**	105	**13**	73	11	20581	539	7	4340	72	84	93	13x	54x
Maldives	**61**	258	**76**	158	54	263	11	1	990	64	93	134	-	-
Mali	**7**	500	**220**	285	134	11134	539	119	250	47	31	32		
Malta	**154**	42	**11**	37	10	369	5	0	7910x	77	91	108	-	-
Marshall Islands	**54**		**92**		63	57	2	0	1660x		97x	95	-	-
Mauritania	**15**	330	**183**	175	124	2333	90	16	460	53	38	74	14x	47x
Mauritius	**123**	84	**23**	62	20	1129	22	1	3380	-	83	106		
Mexico	**102**	148	**32**	103	27	92718	2351	75	3320	72	90	111	12	55
Micronesia, Fed. States of	**116**		**27**		21	126	4	0	1910		97x	100	-	-
Moldova, Rep. of	**102**	88	**32**	64	26	4444	61	2	370	68	89	94	19	42
Monaco	**175**		**6**		5	32	0	-	-	-	-	-	-	-

Table 1: Basic indicators

	Under-5 mortality rank	Under-5 mortality rate 1960	Under-5 mortality rate 1996	Infant mortality rate (under 1) 1980	Infant mortality rate (under 1) 1996	Total population (thousands) 1996	Annual no. of births (thousands) 1996	Annual no. of under-5 deaths (thousands) 1996	GNP per capita (US$) 1995	Life expectancy at birth (years) 1996	Total adult literacy rate 1995	Primary school enrolment ratio (gross) 1990-95	% share of household income 1990-96 lowest 40%	% share of household income 1990-96 highest 20%
Mongolia	67	185	71	128	55	2515	70	5	310	65	83	84	..	..
Morocco	64	220	74	135	64	27021	714	53	1110	66	44	80	17	46
Mozambique	9	280	214	163	133	17796	763	163	80	47	40	65	..	..
Myanmar	25	237	150	158	105	45922	1276	191	220x	56	83	100	..	..
Namibia	60	206	77	129	60	1575	57	4	2000	56	76x	137	..	..
Nauru	104	..	31	..	25	11	0	0	..	..	..	..	..	..
Nepal	42	315	116	212	82	22021	822	95	200	56	28	109	19	45
Netherlands	175	22	6	19	5	15575	190	1	24000	78	..	97	21x	37x
New Zealand	164	26	7	22	7	3602	56	0	14340	77	..	102	16x	45x
Nicaragua	73	209	57	140	44	4238	145	8	380	68	66	104	12	55
Niger	1	320	320	191	191	9465	464	155	220	48	14	30	19	44
Nigeria	14	204	191	122	114	115020	4975	950	260	52	57	69	13	49
Niue	..	..	..	..	..	2	0	..	..	..	..	99x	..	..
Norway	175	23	6	19	5	4349	59	0	31250	77	..	99	19x	37x
Oman	139	290	18	164	15	2302	102	2	4820	70	59x	83	..	..
Pakistan	33	226	136	139	95	139973	5207	708	460	63	39	69	21	40
Palau	97	..	35	..	25	17	1	0	790x	..	98x	103	..	..
Panama	133	104	28	67	18	2677	62	1	2750	74	91	106	9x	60x
Papua New Guinea	44	204	112	137	79	4400	144	16	1160	57	72	62	..	..
Paraguay	100	90	34	66	28	4957	156	5	1690	69	92	109	..	..
Peru	72	234	58	142	45	23944	615	36	2310	68	89	123	14	50
Philippines	93	107	38	77	32	69292	2029	77	1050	68	95	111	17x	48x
Poland	147	70	14	62	12	38601	483	6	2790	71	..	99	23	37
Portugal	164	112	7	61	7	9808	110	1	9740	75	90	117	..	..
Qatar	132	239	21	145	17	558	10	0	11600	71	79	87	..	..
Romania	117	92	25	69	21	22655	247	6	1480	70	98	84	24	35
Russian Federation	117	65	25	48	20	148126	1427	36	2240	65	99	109	12	54
Rwanda	19	210	170	124	105	5397	263	45	180	36	61	77	23x	35x
Saint Kitts and Nevis	93	..	38	..	31	41	1	0	5170	69	90x	..	..	..
Saint Lucia	127	..	22	..	18	144	4	0	3370	71	..	95x	..	..
Saint Vincent/Grenadines	123	..	23	..	19	113	2	0	2280	72	82x	95x	..	..
Samoa	77	210	53	134	42	166	4	0	1120	69	99x	100	..	..
San Marino	149	..	13	..	12	25	0	0	..	..	..	..	..	..
Sao Tome and Principe	57	..	80	..	62	135	6	0	350	69	57x	..	..	..
Saudi Arabia	108	292	30	170	25	18836	657	20	7040	71	63	77	..	..
Senegal	36	300	127	173	74	8532	356	45	600	51	33	60	11	49
Seychelles	136	..	19	..	15	74	3	0	6620	72	84x	102x	..	..
Sierra Leone	3	365	284	219	164	4297	207	59	180	37	31	51	..	..
Singapore	189	40	4	31	4	3084	56	0	26730	77	91	107	15x	49x
Slovakia	154	40	11	33	10	5347	64	1	2950	71	..	101	28	31
Slovenia	175	45	6	37	6	1924	18	0	8200	73	99x	100	23	38
Solomon Islands	113	185	29	120	24	391	14	0	910	71	62x	97	..	..
Somalia	10	294	211	175	125	9822	504	106	110x	48	24x	11x	..	..
South Africa	69	126	66	89	50	42393	1280	84	3160	65	82	117	9	63
Spain	186	57	5	46	5	39674	387	2	13560	78	97	104	22x	37x
Sri Lanka	136	130	19	90	17	18100	322	6	700	73	90	105	22	39
Sudan	42	210	116	125	73	27291	929	108	310x	54	46	55	..	..
Suriname	104	96	31	70	25	432	9	0	980	71	93	127x	..	..
Swaziland	53	233	97	157	68	881	33	3	1170	59	77	122	..	..
Sweden	189	20	4	16	4	8819	108	0	23750	78	..	100	21x	37x
Switzerland	186	27	5	22	5	7224	80	0	40630	78	..	101	17x	45x
Syria	100	201	34	136	28	14674	450	15	1120	68	71	103	..	..
Tajikistan	61	140	76	95	56	5835	184	14	340	67	100	89	..	..
Tanzania	29	240	144	142	93	30799	1281	184	120	51	68	70	19	45
TFYR Macedonia	108	177	30	120	26	2174	32	1	1660	72	..	87	..	..
Thailand	93	148	38	103	31	58703	996	38	2740	69	94	87	14	53
Togo	38	267	125	158	78	4201	179	22	310	50	52	102	..	..
Tonga	123	..	23	..	19	98	2	0	1630	69	99x	99x	..	..

98

...Table 1

	Under-5 mortality rank	Under-5 mortality rate 1960	Under-5 mortality rate 1996	Infant mortality rate (under 1) 1960	Infant mortality rate (under 1) 1996	Total population (thousands) 1996	Annual no. of births (thousands) 1996	Annual no. of under-5 deaths (thousands) 1996	GNP per capita (US$) 1995	Life expectancy at birth (years) 1996	Total adult literacy rate 1995	Primary school enrolment ratio (gross) 1990-95	% share of household income 1990-96 lowest 40%	% share of household income 1990-96 highest 20%
Trinidad and Tobago	**143**	73	**17**	61	15	1297	21	0	3770	73	98	94	.	.
Tunisia	**97**	254	**35**	170	29	9156	223	8	1820	69	67	118	16	46
Turkey	**82**	219	**47**	163	41	61797	1371	64	2780	68	82	97	.	.
Turkmenistan	**58**	150	**78**	100	57	4155	122	10	970	65	98x	.	18	43
Tuvalu	**74**	.	**56**	.	40	10	0	0	650x	.	99x	101	.	.
Uganda	**30**	224	**141**	139	88	20756	1040	147	240	41	62	67	17	48
Ukraine	**121**	53	**24**	41	18	51608	511	12	1630	69	99	87	24	35
United Arab Emirates	**139**	240	**18**	160	15	2260	42	1	17400	75	79	110	.	.
United Kingdom	**164**	27	**7**	23	6	58144	706	5	18700	77	.	114	15x	44x
United States	**163**	30	**8**	26	8	269444	3827	32	26980	76	99x	107	16x	42x
Uruguay	**127**	56	**22**	48	20	3204	54	1	5170	73	97	109	.	.
Uzbekistan	**71**	122	**60**	84	46	23209	674	40	970	68	100	77	.	.
Vanuatu	**77**	225	**53**	141	41	174	5	0	1200	67	64x	106	.	.
Venezuela	**115**	70	**28**	53	24	22311	570	16	3020	72	91	94	11	58
Viet Nam	**85**	219	**44**	147	33	75181	1975	87	240	67	94	114	19	44
Yemen	**50**	340	**105**	230	78	15678	756	79	260	57	33x	83	.	.
Yugoslavia, Fed. Rep.	**127**	120	**22**	87	19	10294	131	3	b	72	98	70	.	.
Zambia	**13**	213	**202**	126	112	8275	356	72	400	43	78	82	12	50
Zimbabwe	**65**	181	**73**	109	49	11439	436	32	540	49	85	115	10	62

Regional summaries

Sub-Saharan Africa	257	**170**	154	105	576069	24777	4224	501	51	57	73	11	58
Middle East and North Africa	241	**65**	154	50	318201	10248	662	1710	65	59	93	.	.
South Asia	239	**119**	146	80	1267705	35132	4173	345	61	49	94	21	42
East Asia and Pacific	201	**54**	133	41	1797840	34355	1843	1043	68	84	114	17	46
Latin America and Caribbean	157	**43**	105	35	479139	11201	484	3271	69	87	110	9	61
CEE/CIS and Baltic States	101	**36**	76	29	474657	6649	237	7086	68	97	97	18	44
Industrialized countries	37	**7**	31	6	838679	10056	70	25826	77	98	104	18	40
Developing countries	216	**97**	137	66	4577675	118889	11546	1101	62	71	99	15	51
Least developed countries	280	**171**	171	109	584510	23695	4041	220	51	48	69	20	43
World	192	**88**	123	60	5752290	132418	11694	4812	63	75	100	18	42

Countries in each region are listed on page 122

Definitions of the indicators

Under-five mortality rate — Probability of dying between birth and exactly five years of age expressed per 1,000 live births.

Infant mortality rate — Probability of dying between birth and exactly one year of age expressed per 1,000 live births.

GNP per capita — Gross national product (GNP) is the sum of gross value added by all resident producers, plus any taxes that are not included in the valuation of output, plus net receipts of primary income from non-resident sources. GNP per capita is the gross national product, converted to United States dollars using the World Bank Atlas method, divided by the mid-year population.

Life expectancy at birth — The number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.

Adult literacy rate — Percentage of persons aged 15 and over who can read and write.

Gross primary school enrolment ratio — The number of children enrolled in primary school, regardless of age, divided by the population of the age group that officially corresponds to primary schooling.

Income share — Percentage of income received by the 20 per cent of households with the highest income and by the 40 per cent of households with the lowest income.

Main data sources

Under-five and infant mortality rates — UNICEF, United Nations Population Division and United Nations Statistics Division.

Total population — United Nations Population Division.

Births — United Nations Population Division.

Under-five deaths — UNICEF.

GNP per capita — World Bank.

Life expectancy — United Nations Population Division.

Adult literacy — United Nations Educational, Scientific and Cultural Organization (UNESCO).

School enrolment — United Nations Educational, Scientific and Cultural Organization (UNESCO).

Household income — World Bank.

Notes

a. Range $765 or less.
b. Range $765 to $3035.
c. Range $3386 or more.

. Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

Table 2: Nutrition

	Under-5 mortality rank	% of children (1990-96) who are:			% of under-fives (1990-97) suffering from:				Total goitre rate (6-11 years) (%) 1985-94	% of households consuming iodized salt 1992-96
		% of infants with low birthweight 1990-94	exclusively breastfed (0-3 months)	breastfed with complementary food (6-9 months)	still breastfeeding (20-23 months)	underweight: moderate & severe	underweight: severe	wasting: moderate & severe	stunting: moderate & severe		
Afghanistan	4	20								20	
Albania	88	7								41	
Algeria	92	9	48	29	21	13	3	9	18	9	92
Andorra	175										
Angola	2	19	3	83	53					7	10
Antigua and Barbuda	127	8				10x	4x	10x	0x		
Argentina	117	7								8	90
Armenia	108									10	
Australia	175	6									
Austria	175	6									
Azerbaijan	85									20	
Bahamas	123										
Bahrain	127	6									
Bangladesh	44	50	51			56	21	18	55	50	44
Barbados	152	10				5x	1x	4x	7x		
Belarus	139									22	37
Belgium	164	6								5	
Belize	85	10	24	49						0	90
Benin	31									24	35
Bhutan	36					38x		4x	56x	25	90
Bolivia	51	17	53	78	36	8	2	1	29	21	92
Bosnia and Herzegovina	143										
Botswana	80	8	41x	82x	23x	15x			44x	8	27
Brazil	79	11	42	30	17	6	1	2	11	14x	95
Brunei Darussalam	154										
Bulgaria	136	5								20	
Burkina Faso	23	21	12			30	8	13	29	16	23
Burundi	17		89x	66x	73x	37	11	9	43	42	60
Cambodia	19					40	7	8	38	15	
Cameroon	51	13	7	72	35	14	3	3	24	26	66
Canada	164	6									
Cape Verde	65	11				14x		3x	26x		
Central African Rep	21	15	23			27	8	7	34	63	65
Chad	27									15	31
Chile	149	5	77	17		1		0	3	9x	95
China	82	9	64			16				20	51
Colombia	104	9	16	61	17	8	1	1	15	7	90
Comoros	39	8	5	87	45	26	8	8	34		
Congo	48	16	43x	95x	27x	24x	3x	4x	21x	8	
Congo, Dem. Rep.	12	15	32	40	64	34	10	10	45	9	12
Cook Islands	108	3									
Costa Rica	146	7	35	47	17	3				4	89
Côte d'Ivoire	25	14	62	54		24	6	8	24	6	
Croatia	154		24								100
Cuba	159	8						1x		10	45
Cyprus	159										
Czech Rep	164	6									
Denmark	175	6								5	
Djibouti	24	11				23	8	11	22		
Dominica	133	10				5x	0x	2x	6x		
Dominican Rep	74	11	25	47	7	6	1	1	11	5	40
Ecuador	88	13	29	52	34	17x	0x	2x	34x	10	97
Egypt	58	10	53	37		15	4	6	25	5	0
El Salvador	88	11	20	71	28	11	1	1	23	25	91
Equatorial Guinea	18										20
Eritrea	41	13	66	36	50	44	17	16	38		80
Estonia	145										
Ethiopia	16	16	74		35	48	16	8	64	31	0

...Table 2

	Under-5 mortality rank	% of infants with low birthweight 1990-94	% of children (1990-96) who are: exclusively breastfed (0-3 months)	breastfed with complementary food (6-9 months)	still breastfeeding (20-23 months)	% of under-fives (1990-97) suffering from: underweight moderate & severe	underweight severe	wasting moderate & severe	stunting moderate & severe	Total goitre rate (6-11 years) (%) 1985-94	% of households consuming iodized salt 1992-96
Fiji	121	12	.	.	.	.	.	.	.	.	31
Finland	189	4	.	.	.	.	.	.	.	.	.
France	175	5	.	.	.	.	.	.	.	5x	.
Gabon	28	.	57	.	.	.	.	.	.	5	.
Gambia	49	.	.	.	61	.	.	.	.	.	0
Georgia	113	.	.	.	.	.	.	.	.	20	.
Germany	175	.	.	.	.	.	.	.	.	10	.
Ghana	47	7	19	63	48	27	8	11	26	10	10
Greece	161	6	.	.	.	.	.	.	.	10	.
Grenada	104	9	.	.	.	.	.	.	.	.	.
Guatemala	74	15	50	56	43	27	6	3	50	20	64
Guinea	11	21	52	.	15	26	9	12	32	55	37
Guinea-Bissau	6	20	.	.	.	23x	.	.	.	19	.
Guyana	56	19	.	.	.	18	2	.	.	.	.
Haiti	34	15	3	83	25	28	8	8	32	4x	10
Holy See	.	.	.	.	.	.	.	.	.	.	.
Honduras	97	9	11	.	.	18	3	2	40	9	85
Hungary	152	9	.	.	.	.	.	.	.	.	.
Iceland	186	.	.	.	.	.	.	.	.	.	.
India	46	33	51	37	67	53	21	16	52	9	70
Indonesia	67	14	47	85	63	11	2	.	4	28	85
Iran	96	9	53	.	.	16	3	7	19	30	82
Iraq	39	15	.	.	.	12	2	3	22	7	50
Ireland	164	4	.	.	.	.	.	.	.	.	.
Israel	161	7	.	.	.	.	.	.	.	.	.
Italy	164	5	.	.	.	.	.	.	.	20	.
Jamaica	154	10	.	.	.	10	1	4	6	.	100
Japan	175	7	.	.	.	.	.	.	.	.	.
Jordan	117	7	32	48	13	9	.	2	16	.	75
Kazakstan	84	.	12	61	21	8	2	3	16	20	53
Kenya	55	16	17	90	54	23	6	8	34	7	100
Kiribati	61	6	.	.	.	.	.	.	.	.	.
Korea, Dem. People's Rep.	108	.	.	.	.	.	.	.	.	.	5
Korea, Rep. of	164	4	.	.	.	.	.	.	.	.	.
Kuwait	147	7	.	.	.	6x	.	3x	12x	.	.
Kyrgyzstan	80	.	38	50	25	.	.	.	.	20	.
Lao People's Dem. Rep.	35	18	36	.	31	40	12	11	47	25	90
Latvia	133	.	.	.	.	.	.	.	.	.	.
Lebanon	88	10	.	.	.	.	.	.	.	15	92
Lesotho	32	11	54	47	52	16	4	5	43	43	73
Liberia	5	.	.	17	25	.	.	.	.	6	.
Libya	70	.	.	.	.	5	.	3	15	6	90
Liechtenstein	164	.	.	.	.	.	.	.	.	.	.
Lithuania	139	.	.	.	.	.	.	.	.	.	.
Luxembourg	164	.	.	.	.	.	.	.	.	.	.
Madagascar	21	17	47	80	45	34	10	7	50	24	1
Malawi	8	20	11	78	68	30	9	7	48	13	58
Malaysia	149	8	.	.	.	23	1	.	.	20	.
Maldives	61	20	8	.	.	38	8	16	30	24	.
Mali	7	17	42	31	73	27	10	11	49	29	9
Malta	154	.	.	.	.	.	.	.	.	.	.
Marshall Islands	54	15	.	.	.	.	.	.	.	.	.
Mauritania	15	11	60	64	58	23	9	7	44	.	3
Mauritius	123	13	16	29	.	16	2	15	10	0	0
Mexico	102	8	39x	36x	21x	14x	.	6x	22x	3	87
Micronesia, Fed. States of	116	9	.	.	.	.	.	.	.	.	.
Moldova, Rep. of	102	4	.	.	.	.	.	.	.	.	.
Monaco	175	.	.	.	.	.	.	.	.	.	.

BEST COPY AVAILABLE

Table 2: Nutrition

	Under-5 mortality rank	% of infants with low birthweight 1990-94	% of children (1990-96) who are: exclusively breastfed (0-3 months)	breastfed with complementary food (6-9 months)	still breastfeeding (20-23 months)	% of under-fives (1990-97) suffering from: underweight moderate & severe	underweight severe	wasting moderate & severe	stunting moderate & severe	Total goitre rate (6-11 years) (%) 1985-94	% of households consuming iodized salt 1992-96
Mongolia	67	6	-	-	-	12	-	2	26	28	42
Morocco	64	9	31	33	20	9	2	2	23	20	-
Mozambique	9	20	-	-	-	27	11	5	55	20	62
Myanmar	25	16	30	40	56	43	16	8	45	18	14
Namibia	60	16	22	65	23	26	6	9	28	35	80
Nauru	104	-	-	-	-	-	-	-	-	-	-
Nepal	42	-	83	63	88	47	16	11	48	44	93
Netherlands	175	-	-	-	-	-	-	-	-	3	-
New Zealand	164	6	-	-	-	-	-	-	-	-	-
Nicaragua	73	15	11	46	17	12	-	2	24	4	88
Niger	1	15	-	67	52	36	12	16	32	9	83
Nigeria	14	16	2	52	43	36	12	9	43	10	83
Niue	-	-	-	-	-	-	-	-	-	-	-
Norway	175	4	-	-	-	-	-	-	-	-	-
Oman	139	8	28	85	64	23	3	13	23	10	35
Pakistan	33	25	16	31	56	38	13	-	-	32	19
Palau	97	8	-	-	-	-	-	-	-	-	-
Panama	133	9	32	38	21	7	1	1	9	13	92
Papua New Guinea	44	23	-	-	-	35x	-	-	-	30	-
Paraguay	100	5	7	61	8	4	1	0	17	49	77
Peru	72	11	63	83	43	8	1	1	26	36	90
Philippines	93	15	33	52	18	30	5	8	33	15	15
Poland	147	-	-	-	-	-	-	-	-	10	-
Portugal	164	5	-	-	-	-	-	-	-	15	-
Qatar	132	-	-	-	-	-	-	-	-	-	-
Romania	117	11	-	-	-	-	-	-	-	10	-
Russian Federation	117	-	-	-	-	-	-	-	-	-	30
Rwanda	19	17	90	68	85	29	6	4	48	49	90
Saint Kitts and Nevis	93	9	-	-	-	-	-	-	-	-	-
Saint Lucia	127	8	-	-	-	-	-	-	-	-	-
Saint Vincent/Grenadines	123	8	-	-	-	-	-	-	-	-	-
Samoa	77	6	-	-	-	-	-	-	-	-	-
San Marino	149	-	-	-	-	-	-	-	-	-	-
Sao Tome and Principe	57	7	-	-	-	17x	-	5x	26x	-	-
Saudi Arabia	108	7	-	-	-	-	-	-	-	-	-
Senegal	36	11	9	81	-	22	-	7	23	12	9
Seychelles	136	10	-	-	-	6x	0x	2x	5x	-	-
Sierra Leone	3	11	-	44	41	29	-	9	35	7	75
Singapore	189	7	-	-	-	-	-	-	-	-	-
Slovakia	154	-	-	-	-	-	-	-	-	-	-
Slovenia	175	-	-	-	-	-	-	-	-	-	-
Solomon Islands	113	20	-	-	-	-	-	-	-	-	-
Somalia	10	16	-	-	-	-	-	-	-	7	-
South Africa	69	-	-	-	-	9	1	3	23	2	40
Spain	186	4	-	-	-	-	-	-	-	10	-
Sri Lanka	136	25	24	60	66	38	7	16	24	14	7
Sudan	42	15	14x	45x	44x	34	11	13	33	20	-
Suriname	104	13	-	-	-	-	-	-	-	-	-
Swaziland	53	10	37	51	20	10x	-	1x	30x	-	26
Sweden	189	5	-	-	-	-	-	-	-	-	-
Switzerland	186	5	-	-	-	-	-	-	-	-	-
Syria	100	11	-	50	-	13	4	9	21	73	36
Tajikistan	61	-	-	-	-	-	-	-	-	20	20
Tanzania	29	14	40	-	-	27	8	6	42	37	14
TFYR Macedonia	108	-	-	-	-	-	-	-	-	-	100
Thailand	93	13	4x	69x	34x	26x	4x	6x	22x	8	50
Togo	38	20	-	25	99	19	4	-	34	22	1
Tonga	123	2	-	-	-	-	-	-	-	-	-

BEST COPY AVAILABLE

...Table 2

	Under-5 mortality rank	% of infants with low birthweight 1990-94	% of children (1990-96) who are: exclusively breastfed (0-3 months)	breastfed with complementary food (6-9 months)	still breastfeeding (20-23 months)	% of under-fives (1990-97) suffering from: underweight moderate & severe	underweight severe	wasting moderate & severe	stunting moderate & severe	Total goitre rate (6-11 years) (%) 1985-94	% of households consuming iodized salt 1992-96
Trinidad and Tobago	**143**	10	10x	39x	16x	7x	0x	4x	5x	..	..
Tunisia	**97**	8	12	..	16	9	..	4	23	4x	98
Turkey	**82**	8	14	17	14	10	3	..	..	36	18
Turkmenistan	**58**	5	54	..	..	..	..	..	..	20	0
Tuvalu	**74**	2	..	..	..	..	..	..	..	..	..
Uganda	**30**	..	70	64	40	26	7	5	38	7	69
Ukraine	**121**	..	..	..	..	..	..	..	..	10	4
United Arab Emirates	**139**	6	..	..	26	..	..	..	..	..	..
United Kingdom	**164**	7	..	..	..	..	..	..	..	..	..
United States	**163**	7	..	..	..	..	..	..	..	..	..
Uruguay	**127**	8	..	..	..	7x	2x	..	16x	..	..
Uzbekistan	**71**	..	4	..	..	..	..	..	..	18	0
Vanuatu	**77**	7	..	..	..	20x	..	..	19x	..	..
Venezuela	**115**	9	..	..	..	6x	..	2x	6x	11	65
Viet Nam	**85**	17	..	..	..	45	11	12	47	20	59
Yemen	**50**	19	..	..	31	39	13	..	39	32	21
Yugoslavia, Fed. Rep.	**127**	..	..	..	..	..	..	..	..	..	70
Zambia	**13**	13	13	68	34	28	9	6	53	51x	90
Zimbabwe	**65**	14	16	83	26	16	3	6	21	42	80

Regional summaries

Sub-Saharan Africa	16	32	61	47	30	10	8	42	18	50
Middle East and North Africa	11	43	39	..	17	5	7	23	20	52
South Asia	33	46	32	65	51	19	17	52	18	61
East Asia and Pacific	11	56	70	..	20	..	..	..	21	52
Latin America and Caribbean	10	38	44	22	10	1	3	16	12	87
CEE/CIS and Baltic States	..	..	..	..	..	..	..	..	20	25
Industrialized countries	6	..	..	..	..	..	..	..	..	..
Developing countries	18	44	45	50	30	11	11	37	18	57
Least developed countries	23	46	56	51	39	13	10	47	29	38
World	17	44	45	50	30	11	11	37	18	56

Countries in each region are listed on page 122.

Definitions of the indicators

Low birthweight – Less than 2,500 grams.

Underweight – Moderate and severe — below minus two standard deviations from median weight for age of reference population; severe — below minus three standard deviations from median weight for age of reference population.

Wasting – Moderate and severe — below minus two standard deviations from median weight for height of reference population.

Stunting – Moderate and severe — below minus two standard deviations from median height for age of reference population.

Total goitre rate – Percentage of children aged 6-11 with palpable or visible goitre. This is an indicator of iodine deficiency, which causes brain damage and mental retardation.

Main data sources

Low birthweight – World Health Organization (WHO).

Breastfeeding – Demographic and Health Surveys, Multiple Indicator Cluster Surveys (MICS) and World Health Organization (WHO).

Underweight, wasting and stunting – Demographic and Health Surveys, Multiple Indicator Cluster Surveys (MICS) and World Health Organization (WHO).

Salt iodization – UNICEF and Multiple Indicator Cluster Surveys (MICS).

Goitre rate – World Health Organization (WHO).

Notes

.. Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Table 3: Health

	Under-5 mortality rank	% of population with access to safe water 1990-96			% of population with access to adequate sanitation 1990-96			% of routine EPI vaccines financed by government 1995-96	% fully immunized 1995-96					ORT use rate (%) 1990-97
									1-year-old children				pregnant women	
		total	urban	rural	total	urban	rural	total	TB	DPT	polio	measles	tetanus	
Afghanistan	4	12	39	5	8	38	1	0	47	31	31	42	37	.
Albania	88	.	.	.	.	.	.	.	94	98	100	92	.	.
Algeria	92	78	91	64	91	99	80	.	94	75	75	68	34	98
Andorra	175	.	.	.	.	.	.	.	.	.	.	.	.	.
Angola	2	32	69	15	16	34	8	.	74	42	42	65	28	.
Antigua and Barbuda	127	.	.	.	95	.	.	100	.	100	100	100	.	.
Argentina	117	71	77	29	68	73	37	100	100	83	90	100	63	.
Armenia	108	.	.	.	.	.	.	0	82	86	97	89	.	.
Australia	175	.	.	.	.	.	.	.	.	.	.	.	.	.
Austria	175	.	.	.	.	.	.	.	.	90	90	60	.	.
Azerbaijan	85	.	.	.	.	.	.	.	90	95	97	99	.	.
Bahamas	123	.	.	.	.	.	.	100	.	85	85	92	75x	.
Bahrain	127	.	100	.	.	100	.	.	.	98	98	95	54	5
Bangladesh	44	97	99	96	48	79	44	74	88	66	66	59	72	95
Barbados	152	100	100	100	100	100	100	100	.	88	85	100	100	.
Belarus	139	.	.	.	.	.	.	.	93x	95	94	74	.	.
Belgium	164	.	.	.	.	.	.	.	.	97	94	70	.	.
Belize	85	89	96	82	57	73	87	100	90	85	85	81	88	.
Benin	31	50	41	53	20	54	6	15	90	80	80	74	75	60
Bhutan	36	58	75	54	70	90	66	0	98	87	86	86	70	85
Bolivia	51	63	86	32	58	74	37	65	90	76	76	87	52	41
Bosnia and Herzegovina	143	.	.	.	.	.	.	.	97	88	86	88	.	.
Botswana	80	93x	100x	91x	56	91	41	100	67	83	81	82	61	.
Brazil	79	76	88	25	70	80	30	100	90	75	73	74	45	54
Brunei Darussalam	154	.	.	.	.	.	.	.	100x	100x	100x	100x	50x	.
Bulgaria	136	.	.	.	.	.	.	.	98	100	94	93	.	.
Burkina Faso	23	42	66	37	37	41	33	34	61	48	48	54	27	100
Burundi	17	52	92	49	51	60	50	.	77	63	63	50	33	.
Cambodia	19	36	65	33	14	81	8	0	90	75	76	72	36	.
Cameroon	51	50	57	43	50	64	36	.	54	46	46	46	12	43
Canada	164	.	.	.	.	.	.	.	.	93	89	98	.	.
Cape Verde	65	51	70	34	24	40	10	100	80	73	73	66	4	.
Central African Rep	21	38	55	21	27	38	16	.	94	53	53	46	15	100
Chad	27	24	48	17	21	73	7	100	40	19	19	28	50	.
Chile	149	95	98	81	.	86	.	100	96	97	92	96	.	.
China	82	67	97	56	24	74	7	100	97	95	96	97	13	85
Colombia	104	85	97	56	85	97	56	99	98	92	93	95	57	53
Comoros	39	53	76	46	23	40	16	.	89	60	57	48	34	32
Congo	48	34	53	7	69	.	.	0	50	47	47	42	55	41
Congo, Dem. Rep.	12	42	89	26	18	53	8	.	51	36	36	41	20	90
Cook Islands	108	100	100	100	100	100	100	50	90	75	75	72	64	.
Costa Rica	146	96	100	92	84	95	70	100	91	84	84	86	90	31
Côte d'Ivoire	25	42	56	32	39	71	17	100	68	55	55	65	22	73
Croatia	154	.	.	.	.	.	.	.	90	91	91	91	91	5
Cuba	159	93	96	85	66	71	51	.	99	100	93x	94	61x	.
Cyprus	159	.	100	.	.	96	.	.	.	98	98	90	57x	.
Czech Rep.	164	.	.	.	.	.	.	.	96	97	98	97	.	.
Denmark	175	.	.	.	.	.	.	.	.	89x	100x	88x	.	.
Djibouti	24	90	77	100	55	64	24	.	58	49	49	47	39	.
Dominica	133	96	97	95	80	80	85	100	100	100	100	100	.	.
Dominican Rep.	74	65	80	.	78	76	83	100	98	58	48	78	96	39
Ecuador	88	68	80	49	76	95	49	100	100	88	89	79	25	64
Egypt	58	87	97	79	88	98	79	100	91	77	77	85	55	95
El Salvador	88	69	85	46	81	91	65	100	100	100	100	97	69	69
Equatorial Guinea	18	95	88	100	54	61	48	.	99	64	64	61	53	.
Eritrea	41	22	60	8	13	48	.	0	52	46	46	38	23	38
Estonia	145	.	.	.	.	.	.	.	99	90	93	86	.	.
Ethiopia	16	25	91	19	19	97	7	0	87	67	67	54	36	95

BEST COPY AVAILABLE

	Under-5 mortality rank	% of population with access to safe water 1990-96			% of population with access to adequate sanitation 1990-96			% of routine EPI vaccines financed by government 1995-96	% fully immunized 1995-96					ORT use rate (%) 1990-97
									1-year-old children				pregnant women	
		total	urban	rural	total	urban	rural	total	TB	DPT	polio	measles	tetanus	
Fiji	121	100	100	100	92	100	85	50	100	97	99	94	100	-
Finland	189								100	100	100	98		
France	175								83	96	97	82		
Gabon	28	69x	90x	50x					54	41	41	38	4	25
Gambia	49	48	67		37	83	23	100	99	97	97	89	92	
Georgia	113								30	58	82	63		14
Germany	175									45	80	75		
Ghana	47	65	88	52	55	62	44	50	65	51	52	53	9	93
Greece	161								70	78	95	90		
Grenada	104							100		80	80	85	80	
Guatemala	74	77	76	78	83	95	74	100	76	73	73	69	81	22
Guinea	11	46	69	36	31	54	19		59	48	48	49	43	31
Guinea Bissau	6	59	32	67	30	24	32	0	72	56	58	53	43	
Guyana	56	61	90	45	81	82	80	100	88	83	83	91	56	
Haiti	34	37	50	28	25	49	17	0	68	34	34	31	49	31
Holy See	-													
Honduras	97	87	96	79	87	97	78	100	100	93	94	91	99	32
Hungary	152								100	100	100	100		
Iceland	186									98x	99x	98x		
India	46	81	95	79	29	76	14	100	96	89	90	81	78	67
Indonesia	67	62	78	54	51	73	40	100	99	91	90	92	75	97
Iran	96	90	98	82	81	86	74	100	90	96	97	95	50	37
Iraq	39	78	92	44	70	85	37	0	99	94	95	97	65	
Ireland	164													
Israel	161									92	93	94		
Italy	164									50	98	50		
Jamaica	154	86			89	100	80	100	98	92	92	99	82	
Japan	175	97x	100x	85x		95x			91	85	91	68		
Jordan	117	98			77					99	99	98	41	41
Kazakstan	84	93	99	84	99	100	98	20	93	94	98	97		31
Kenya	55	53	67	49	77	89	81	0	56	46	43	38	21	76
Kiribati	61	100	100	100	100	100	100	75	100	79	82	64	41	
Korea, Dem. People's Rep.	108	81							60	96	58	60	95	
Korea, Rep. of	164	93	100	76	100	100	100		93x	93x	93x	92x		
Kuwait	147					100x				100	100	99	21	
Kyrgyzstan	80	71			94				90	82	81	80		98
Lao People's Dem. Rep.	35	44			18			0	62	28	33	62	45	
Latvia	133								100	64	77	82	64	
Lebanon	88	94	96	88	63	81	8			94	94	85		82
Lesotho	32	52	91	57	38	66	35		56	58	58	82	10	84
Liberia	5	46	79	13	30	56	4	0	84	45	45	44	35	94
Libya	70	97	97	97	98	99	94		99	96	96	92	45x	48
Liechtenstein	164													
Lithuania	139								98	91	93	96		
Luxembourg	164									95x	90x	80x		
Madagascar	21	34	68	21	41	77	29	10	87	73	73	68	33	85
Malawi	8	37	80	32	6	22	4		95	90	82	89	56	78
Malaysia	149	78	96	66	94				97x	90x	90x	81x	79x	
Maldives	61	96	100	81	66	100	54		98	95	95	94	93	
Mali	7	66	87	55	6	12	3	65	70	29	30	35	32	29
Malta	154								96	84	92	51		
Marshall Islands	54	74	100	45	74	100	45	100	88	74	75	69	15x	
Mauritania	15	74	88	59	32	44	19	0	93	50	50	53	28	51
Mauritius	123	98	95	100	100	100	100	100	87	90	90	61	79	
Mexico	102	83	92	57	72	85	32	100	97	83	84	75	69	81
Micronesia, Fed. States of	116	100	100	100	100	100	100	100	50	83	81	90	44	
Moldova, Rep. of	102	55x	98x	18x	50x	90x	8x		98	97	99	98		
Monaco	175													

BEST COPY AVAILABLE

Table 3: Health

	Under-5 mortality rank	% of population with access to safe water 1990-96			% of population with access to adequate sanitation 1990-96			% of routine EPI vaccines financed by government 1995-96	% fully immunized 1995-96					ORT use rate (%) 1990-97
									1-year-old children				pregnant women	
		total	urban	rural	total	urban	rural	total	TB	DPT	polio	measles	tetanus	
Mongolia	67	40	73	3	86	99	74	.	92	90	90	88	.	.
Morocco	64	65	98	34	58	94	24	100	96	95	95	93	100	29
Mozambique	9	63	.	.	54	.	.	0	83	60	60	67	61	83
Myanmar	25	60	78	50	43	56	36	0	92	88	87	86	79	96
Namibia	60	57	87	42	34	77	12	.	79	70	71	61	75	66
Nauru	104	.	.	.	.	.	.	.	.	.	.	.	.	.
Nepal	42	63	88	60	18	58	12	40	73	51	48	45	11x	29
Netherlands	175	.	.	.	.	.	.	.	.	97	97	94	.	.
New Zealand	164	97x	100x	82x	.	.	.	.	20	84	84	87	.	.
Nicaragua	73	61	81	27	31	34	27	99	93	78	66	78	96	54
Niger	1	48	76	44	17	79	5	0	63	33	33	59	31	85
Nigeria	14	50	80	39	57	82	48	100	49	28	32	45	36	86
Niue	-	100	100	100	100	100	100	25	100	100	100	100	.	.
Norway	175	.	.	.	.	.	.	.	.	92	92	93	.	.
Oman	139	82	.	.	78	.	.	100	96	100	100	98	98	85
Pakistan	33	74	92	69	47	77	22	100	93	77	77	78	54	97
Palau	97	88	.	.	98	.	.	.	100	100	100	100	55	.
Panama	133	93	.	.	83	.	.	100	100	93	93	92	24	94
Papua New Guinea	44	28	84	17	22	82	11	.	78	55	57	44	50	.
Paraguay	100	60	.	.	41	65	14	100	89	80	81	81	69	33
Peru	72	67	84	33	72	89	37	100	99	72	66	71	51	55
Philippines	93	84	93	80	75	89	63	88	82	70	67	72	47	87
Poland	147	.	.	.	.	.	.	.	94	95	95	91	.	.
Portugal	164	.	.	.	.	.	.	.	91	95	95	99	.	.
Qatar	132	.	100	.	.	100	.	.	96	92	92	86	.	71
Romania	117	.	.	.	.	.	.	100	100	98	97	94	.	.
Russian Federation	117	.	.	.	.	.	.	.	97	87	97	95	.	.
Rwanda	19	.	.	75	.	.	85	.	93	98	98	76	43	47
Saint Kitts and Nevis	93	100	100	100	100	98	100	100	.	100	98	100	.	.
Saint Lucia	127	.	.	.	.	.	.	100	89	88	88	95	.	.
Saint Vincent/Grenadines	123	89	100	85	98	100	100	100	100	100	100	100	.	.
Samoa	77	82	100	77	94	100	92	30	98	95	95	96	96	.
San Marino	149	.	.	.	.	.	.	.	.	.	.	.	.	.
Sao Tome and Principe	57	82	.	.	35	.	.	.	85	66	61	57	49	74
Saudi Arabia	108	95x	100x	74x	86x	100x	30x	.	91	93	93	92	60	58
Senegal	36	63	90	44	39	71	15	100	80	62	62	60	34	84
Seychelles	136	.	.	.	.	.	.	.	100	100	100	98	100	.
Sierra Leone	3	34	58	21	11	17	8	3	77	65	65	79	65	.
Singapore	189	100x	100x	.	.	.	.	.	97	95	93	88	.	.
Slovakia	154	.	.	.	.	.	.	.	98	98	98	99	.	.
Slovenia	175	.	.	.	.	.	.	.	99x	98x	99x	91x	.	.
Solomon Islands	113	61	82	58	11	73	2	60	71	72	72	67	63	.
Somalia	10	31	46	28	43	69	35	0	43	21	21	33	28	97
South Africa	69	99	99	53	53	85	12	100	95	73	72	76	76x	.
Spain	186	.	.	.	.	.	.	.	.	88	90	90x	.	.
Sri Lanka	136	57	88	52	63	68	62	100	88	90	91	86	81	34
Sudan	42	50	66	45	22	79	4	0	96	79	80	75	44	35
Suriname	104	.	.	.	.	.	43	100	.	80	79	78	99x	.
Swaziland	53	60	89	46	70	92	59	.	68	70	71	59	65	99
Sweden	189	.	.	.	.	.	.	.	.	99	99	96	.	.
Switzerland	186	.	.	.	.	.	.	.	.	.	.	.	.	.
Syria	100	86	95	77	67	96	31	100	100	96	96	95	78	27
Tajikistan	61	60	82	49	.	46	.	.	96	93	96	80	.	.
Tanzania	29	38	73	29	86	96	84	0	96	85	80	81	92	91
TFYR Macedonia	108	.	.	.	.	.	.	14	98	93	94	90	91x	.
Thailand	93	89	94	88	96	98	95	.	98	94	94	85	88	95
Togo	38	55	82	41	41	76	22	0	63	82	82	39	43	94
Tonga	123	100	100	100	100	100	100	50	99	95	93	94	88	.

BEST COPY AVAILABLE

...Table 3

	Under-5 mortality rank	% of population with access to safe water 1990-96			% of population with access to adequate sanitation 1990-96			% of routine EPI vaccines financed by government 1995-96	% fully immunized 1995-96					ORT use rate (%) 1990-97
									1-year-old children				pregnant women	
		total	urban	rural	total	urban	rural	total	TB	DPT	polio	measles	tetanus	
Trinidad and Tobago	**143**	97	99	91	79	99	98	100	..	89	90	88	19x	..
Tunisia	**97**	98	100	95	80	96	52	100	86	91	91	86	80	41
Turkey	**82**	49	63	28	62	83	31	100	69	84	83	84	32	100
Turkmenistan	**58**	74	..	..	91	..	..	9	88	80	83	66	..	98
Tuvalu	**74**	97	100	95	87	90	85	70	88	87	85	94	53	..
Uganda	**30**	46	77	41	57	75	55	35	96	68	67	66	55	49
Ukraine	**121**	..	..	..	..	..	..	..	92x	94x	95x	96x	..	..
United Arab Emirates	**139**	95	..	..	77	93	22	..	99	90	90	90	..	..
United Kingdom	**164**	..	..	..	..	..	..	..	..	94	96	92	..	..
United States	**163**	..	..	..	..	..	..	..	..	94	84	89	..	..
Uruguay	**127**	..	95	..	..	98	..	100	98	89	89	85	13x	..
Uzbekistan	**71**	62	82	49	22	46x	..	16	95	89	99	81	..	..
Vanuatu	**77**	87x	..	..	91x	..	..	100	72	67	68	61	15	..
Venezuela	**115**	79	80	75	59	64	30	100	90	57	73	64	60	..
Viet Nam	**85**	43	47	42	21	43	15	29	95	94	94	96	82	..
Yemen	**50**	61	88	55	24	47	17	0	59	59	59	51	55	92
Yugoslavia, Fed. Rep.	**127**	..	..	..	..	..	..	0	97	91	94	81x	..	..
Zambia	**13**	27	50	17	64	89	43	10	100	83	81	93	46	99
Zimbabwe	**65**	79	99	69	52	96	32	90	74	80	80	77	65	60

Regional summaries

Sub-Saharan Africa	49	79	36	44	73	33	48	70	52	53	56	38	81
Middle East and North Africa	81	95	67	72	91	52	71	91	86	87	86	57	59
South Asia	80	85	78	33	71	19	93	93	83	83	77	71	73
East Asia and Pacific	67	93	57	35	76	18	89	95	92	92	92	35	87
Latin America and Caribbean	77	88	46	71	81	41	97	93	79	79	78	58	56
CEE/CIS and Baltic States	..	..	..	..	..	..	..	89	89	93	89	..	..
Industrialized countries	..	..	..	..	..	..	..	..	86	89	83	..	..
Developing countries	70	88	61	42	79	23	82	88	79	80	78	51	76
Least developed countries	54	78	48	35	66	28	71	78	60	60	59	48	80
World	71	89	61	42	78	23	82	89	80	81	79	51	76

Countries in each region are listed on page 122.

Definitions of the indicators

Government funding of vaccines – Percentage of vaccines routinely administered in a country to protect children against TB, DPT, measles and polio that are financed by the national government.

EPI – Extended Programme on Immunization: the immunizations in this programme include those against TB, DPT, polio and measles, as well as protecting babies against neonatal tetanus by vaccination of pregnant women. Other vaccines (e.g. against hepatitis B or yellow fever) may be included in the programme in some countries.

DPT – Diphtheria, pertussis (whooping cough) and tetanus.

ORT use – Percentage of all cases of diarrhoea in children under five years of age treated with oral rehydration salts and/or recommended home fluids.

Main data sources

Access to safe drinking water and adequate sanitation facilities – UNICEF, World Health Organization (WHO) and Multiple Indicator Cluster Surveys (MICS).

Government funding of vaccines – UNICEF.

Immunization – World Health Organization (WHO), UNICEF, Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS).

ORT use – Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys and World Health Organization (WHO).

Notes

.. Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Table 4: Education

	Under 5 mortality rank	Adult literacy rate 1980 male	1980 female	1995 male	1995 female	No. of sets per 1000 population 1994 radio	television	Primary school enrolment ratio 1960 (gross) male	1960 female	1990-95 (gross) male	1990-95 female	1993-97 (net) male	1993-97 female	% of primary school children reaching grade 5 1990-95	Secondary school enrolment ratio 1990-95 (gross) male	female
Afghanistan	4	33	6	47	15	118	10	14	2	63	32	35y	11y	43x	32	11
Albania	88					190	91	102	86	98	99	95	97	92	36	37
Algeria	92	55	24	74	49	236	79	55	37	111	98	99	91	95	66	58
Andorra	175					711	367									
Angola	2	16x	7x	56x	29x	30	7	30	14	95	87			34		
Antigua and Barbuda	127					427	370									
Argentina	117	94	94	96	96	673	219	99	99	108	107				70	75
Armenia	108			100	99		225			87	93				80	90
Australia	175					1291	489	103	103	107	106	98	98	99	83	86
Austria	175					619	480	106	104	103	103	100	100	96	109	104
Azerbaijan	85			100	99					120	115				87	85
Bahamas	123	98	96	99	98	735	226	125	112	100	103	92x	96x	78	95	95
Bahrain	127	80	60	89	79	556	430	103	50	110	113	99	100	94	97	100
Bangladesh	44	41	17	49	26	47	6	60	31	84	73	82y	82y	47x	25	13
Barbados	152	97	94	98	97	877	279	116	101	90	91	78x	78x		90x	80x
Belarus	139			100	99	295	226			98	95	97	94	98	92	97
Belgium	164	99x	99x			774	453	111	108	99	100	98	98		103	104
Belize	85			70	70	581	167			113	109	100	98	70	46	52
Benin	31	28	10	49	26	91	6	40	15	88	44	74	43	61	17	7
Bhutan	36	41	15	56	29	17		5	0	31x	19x			82	7x	2x
Bolivia	51	81	59	91	76	670	113	70	43	99	90	90y	89y	60	40	34
Bosnia and Herzegovina	143					227										
Botswana	80	70	43	81	60	125	17	37	43	114	115	94	99	89	54	58
Brazil	79	76	73	83	83	393	209	58	56			93y	94y	70		
Brunei Darussalam	154	86	68	93	83	271	241	117	101	113	106	91	91	95	67	73
Bulgaria	136			99	98	454	363	94	92	88	84	88	86	95	68	72
Burkina Faso	23	19	4	30	9	28	6	12	5	48	31	37	24	79	12	6
Burundi	17	37	12	49	23	64	2	31	10	76	82	56x	49x	74	8	5
Cambodia	19	74x	23x	80x	53x	108	8	85	48	130	106			50	31	18
Cameroon	51	59	30	75	52	148	24	81	40	93	84	65y	60y	66	32	22
Canada	164					1051	685	108	105	104	102	96	94	97	106	106
Cape Verde	65	64	39	81	64	176	3	40	28	132	130	100	100		28	25
Central African Rep	21	41	19	69	52	73	5	52	11	88x	55x	70y	55y	24	17x	6x
Chad	27	47	19	62	35	240	1	30	4	75	36			29	13	3
Chile	149	92	91	95	95	345	211	87	86	100	98	87	85	92	66	70
China	82	79	53	90	73	164	189	131	78	120	116	99	98	92	60	51
Colombia	104	87	87	91	91	178	118	71	72	118	120	90y	91y	58	57	68
Comoros	39	56	40	64	50	129	0	22	4	91	69	58	48	45	21	17
Congo	48	65	40	83	67	115	7							54		
Congo, Dem. Rep	12	75	45	87	68	96	7	93	34	78	58	71	50	64	33	15
Cook Islands	108				99x	700	179									
Costa Rica	146	92	91	95	95	260	142	99	98	107	105	86x	87x	89	47	51
Côte d'Ivoire	25	34	14	50	30	143	60	64	23	78	58	58y	46y	73	33	17
Croatia	154			98	97	261	253			87	86	93	92	98	75	81
Cuba	159	91	87	96	95	347	171	109	108	104	103	99	99	94	70	79
Cyprus	159			99x	91x	300	320			100	100	96	96	100	98	98
Czech Rep	164					631	478			100	100	98	98	99	90	94
Denmark	175					1036	539	103	103	99	99	98	99	99	113	117
Djibouti	24	45	18	60	33	81	44	32	12	43	33	37	28	82	15	10
Dominica	133					600	75							84		
Dominican Rep	74	75	74	82	82	173	80	75	74	103	104	79	83	58	34	47
Ecuador	88	86	79	92	88	327	98	82	75	124	122	91	92	77	54	56
Egypt	58	54	26	64	39	307	109	79	52	105	91	83y	72y	98	82	71
El Salvador	68	66	60	74	70	443	443	56	56	79	80	76	80	58	27	30
Equatorial Guinea	18	77	45	90	68	424	10	92	54							
Eritrea	41					87	9			54	43	33	30	79	19	13
Estonia	145			99	99	467	367			103	100	93	94	97	92	90
Ethiopia	16	32	14	46	25	197	4	9	3	33	21	28	19	51	11	10

BEST COPY AVAILABLE

	Under-5 mortality rank	Adult literacy rate 1980 male	Adult literacy rate 1980 female	Adult literacy rate 1995 male	Adult literacy rate 1995 female	No. of sets per 1000 population 1994 radio	No. of sets per 1000 population 1994 television	Primary school enrolment ratio 1980 (gross) male	Primary school enrolment ratio 1980 (gross) female	Primary school enrolment ratio 1990-95 (gross) male	Primary school enrolment ratio 1990-95 (gross) female	Primary school enrolment ratio 1993-97 (net) male	Primary school enrolment ratio 1993-97 (net) female	% of primary school children reaching grade 5 1990-95	Secondary school enrolment ratio 1990-95 (gross) male	Secondary school enrolment ratio 1990-95 (gross) female
Fiji	**121**	87	79	94	89	607	17	110	96	128	127	99x	100x	87	64	65
Finland	**189**					1003	511	100	95	100	100	99	99	100	110	130
France	**175**	99x	98x	.	.	891	591	144	143	107	105	99	99	96	104	107
Gabon	**28**	54	28	74	53	147	38					87y	86y	50x		
Gambia	**49**	37	13	53	25	163	3	21	10	79	56	51y	43y	87	25	13
Georgia	**113**			100	99	550	459			82	81	81	82	98	82	76
Germany	**175**					935	560			97	98	100	100	99	101	100
Ghana	**47**	59	31	76	54	229	89	58	31	83	70	70y	69y	80	45	29
Greece	**161**	93x	76x	98	95	418	206	104	101	95	95	98x	98x	100	99	96
Grenada	**104**					595	337									
Guatemala	**74**	56	41	63	49	68	53	48	39	89	78	61y	55y		25	23
Guinea	**11**	34	11	50	22	43	8	30	11	61	30	39y	26y	54	18	6
Guinea-Bissau	**6**	53	26	68	43	40		35	15	77x	42x	60x	33x	20x	9x	4x
Guyana	**56**	96	93	99	98	491	39	110	99	113x	111x	90	89	93	56x	59x
Haiti	**34**	36	29	48	42	50	5	39	31	58	54	69y	69y	47	22	21
Holy See	.															
Honduras	**97**	64	61	73	73	408	78	68	67	111	112	89	91	.	29	37
Hungary	**152**	98x	98x	99	99	625	429	103	100	97	97	92	94	98	79	83
Iceland	**186**					793	350	.	.	100	96	.	.	.	105	105
India	**46**	55	25	66	38	81	40	83	44	113	91	75y	61y	62	59	38
Indonesia	**67**	78	58	90	78	148	62	78	58	117	113	99	95	90	49	41
Iran	**96**	61	37	78	58	237	62	57	27	104	97	99y	93y	90	76	62
Iraq	**39**	55	25	71	45	218	75	94	36	98	83	83x	74x	72x	53	34
Ireland	**164**					636	302	107	112	104	104	100	100	100	110	115
Israel	**161**	93x	83x	97x	93x	478	275	99	97	95	95	.	.	100	83	89
Italy	**164**	95x	92x	99	98	802	437	112	109	98	99	.	.	97	81	82
Jamaica	**154**	73	81	81	89	436	142	78	79	109	108	100x	100x	96	62	70
Japan	**175**	100x	99x	.	.	912	681	103	102	102	102	100	100	100	98	99
Jordan	**117**	82	54	93	79	243	76			94	95	89x	89x	98	52	54
Kazakstan	**84**	.	.	100	99	376	250			86	86				89	92
Kenya	**55**	72	44	86	70	88	11	62	29	92	91	85y	83y	68	28	23
Kiribati	**61**				92x	209								90		
Korea, Dem. People's Rep.	**108**					126	43	.	.	108x	101x	.	.	.	.	.
Korea, Rep. of	**164**	97	90	99	97	1017	323	108	94	95	96	98	99	100	100	99
Kuwait	**147**	73	59	82	75	445	380	132	99	69	69	65	65	100	65	64
Kyrgyzstan	**80**			99	95					110	111	86y	87y	92	84	89
Lao People's Dem. Rep.	**35**	56	28	69	44	127	8	43	20	123	92	70y	67y	53	31	19
Latvia	**133**			100	100	662	465			85	81	86	82	96	84	89
Lebanon	**88**	91	82	95	90	889	360	111	105	114	110	.	.	.	75	83
Lesotho	**32**	71	45	81	62	33	10	73	109	93	104	60	71	79	23	34
Liberia	**5**	38	11	54	22	228	19	40	14	.		59y	53y		.	
Libya	**70**	73	31	88	63	226	100	70	18	110	110	98x	96x		95	95
Liechtenstein	**164**			100x	100x	661	337									
Lithuania	**139**			100	99	387	386			97	95			98	80	84
Luxembourg	**164**	.	.	.	.	636	374	.	.	86	94	.	.	.	78	78
Madagascar	**21**	56x	43x	50	32	192	20	74	57	75	72	62y	61y	28	14	14
Malawi	**8**	64	28	72	42	226	.	50	26	126	114	100	100	94	6	4
Malaysia	**149**	80	60	89	78	432	157	108	79	93	94	91	92	94	58	64
Maldives	**61**	91	89	93	93	118	25	2	3	136	133	.	.	93	49	49
Mali	**7**	20	9	39	23	44	1	15	6	39	25	30	19	86	11	6
Malta	**154**	.	.	91	92	530	747	.	.	110	107	100	99	97	93	83
Marshall Islands	**54**				90x											
Mauritania	**15**	41	19	50	26	147	25	12	3	81	66	64	55	63	19	11
Mauritius	**123**	82	67	87	79	367	222	97	90	107	106	96	96	99	58	60
Mexico	**102**	86	80	92	87	256	163	82	77	114	110	.	.	85	57	58
Micronesia, Fed. States of	**116**	.	.	.	79x	.	.	.	.	.	.	.	.	.	.	.
Moldova, Rep. of	**102**	.	.	98	99	679	271	.	.	95	94	.	.	93	71	74
Monaco	**175**					1016	741							100		

BEST COPY AVAILABLE

Table 4: Education

	Under-5 mortality rank	Adult literacy rate 1980 male	Adult literacy rate 1980 female	Adult literacy rate 1995 male	Adult literacy rate 1995 female	No. of sets per 1000 population 1994 radio	No. of sets per 1000 population 1994 television	Primary school enrolment ratio 1960 (gross) male	Primary school enrolment ratio 1960 (gross) female	Primary school enrolment ratio 1990-95 (gross) male	Primary school enrolment ratio 1990-95 (gross) female	Primary school enrolment ratio 1993-97 (net) male	Primary school enrolment ratio 1993-97 (net) female	% of primary school children reaching grade 5 1990-95	Secondary school enrolment ratio 1990-95 (gross) male	Secondary school enrolment ratio 1990-95 (gross) female
Mongolia	67	82	63	89	77	136	42	74	75	82	87	78	81	..	50	70
Morocco	64	42	16	57	31	219	79	60	24	92	68	81	62	78	43	32
Mozambique	9	44	12	58	23	37	4	57	34	75	54	45	35	47	10	6
Myanmar	25	86	68	89	78	82	5	60	53	112	108	85y	85y	..	23	23
Namibia	60	..	..	78x	74x	139	23	43	48	136	138	..	..	76	57	69
Nauru	104	..	..	..	..	577	..	..	..	..	..	..	..	..	..	..
Nepal	42	31	7	41	14	35	5	20	3	129	88	80y	60y	52	46	23
Netherlands	175	..	..	..	..	909	494	105	104	96	98	99	99	..	129	118
New Zealand	164	..	..	..	..	991	510	110	106	103	101	100	100	94	111	114
Nicaragua	73	61	61	65	67	262	67	57	58	102	105	82	85	47	40	47
Niger	1	14	3	21	7	61	5	8	3	35	21	34y	19y	77	9	5
Nigeria	14	47	23	67	47	196	38	54	31	100	79	60y	58y	80	33	28
Niue	-	..	..	..	99x	563	..	..	..	..	..	..	..	..	..	..
Norway	175	..	..	..	..	799	428	100	100	99	99	99	99	100	118	114
Oman	139	..	..	71x	46x	583	662	..	..	85	80	72	70	96	67	61
Pakistan	33	36	15	50	24	88	19	39	11	94	42	71y	62y	48	33	17
Palau	97	..	..	..	97x	..	..	..	..	..	..	..	..	..	..	..
Panama	133	86	85	91	90	227	170	90	86	108	104	91x	92x	82	60	65
Papua New Guinea	44	70	45	81	63	76	3	24	15	88	75	..	..	59	17	11
Paraguay	100	90	84	94	91	172	83	106	94	111	108	89	89	71	38	40
Peru	72	89	71	95	83	255	99	98	74	..	..	91	90	..	..	..
Philippines	93	91	89	95	94	144	48	96	93	110	111	89y	91y	70	..	..
Poland	147	99x	97x	99x	98x	441	308	110	107	100	98	97	96	100	95	96
Portugal	164	78x	65x	92	87	233	321	132	129	122	118	100	100	..	63	74
Qatar	132	72	65	79	80	428	398	111	63	89	84	81	80	95	82	82
Romania	117	96x	93x	99	97	204	201	101	95	94	93	92	92	99	77	78
Russian Federation	117	..	..	100	99	339	377	..	..	109	108	100	100	..	84	91
Rwanda	19	55	30	70	52	67	..	65	29	78	76	76x	76x	60	11	9
Saint Kitts and Nevis	93	..	..	..	..	666	213	..	..	..	..	..	..	..	..	..
Saint Lucia	127	..	..	..	..	764	189	..	..	..	..	..	..	96	..	..
Saint Vincent/Grenadines	123	..	..	..	..	667	147	..	..	..	..	..	..	..	..	..
Samoa	77	..	..	..	98x	462	39	..	..	..	..	100	99	..	..	..
San Marino	149	..	..	..	..	592	352	..	..	..	..	..	..	100	..	..
Sao Tome and Principe	57	..	..	73x	42x	270	162	..	..	..	..	..	..	..	..	..
Saudi Arabia	108	60	32	72	50	294	255	32	3	79	75	63	61	94	57	47
Senegal	36	31	12	43	23	117	37	36	18	68	51	60	48	81	21	11
Seychelles	136	..	..	83x	86x	490	88	..	..	..	..	..	..	97	..	..
Sierra Leone	3	30	9	45	18	233	11	30	15	60	42	..	..	..	22	12
Singapore	189	92	74	96	86	645	390	122	101	109x	107x	..	..	100x	69x	71x
Slovakia	154	..	..	..	..	568	474	..	..	101	101	..	..	97	88	93
Slovenia	175	..	..	100x	99x	378	320	..	..	100	100	100	99	98	89	91
Solomon Islands	113	..	..	..	56x	122	6	..	..	104	90	..	..	81	21	14
Somalia	10	8x	1x	36x	14x	41	13	4	1	..	..	..	..	..	..	..
South Africa	69	77	75	82	82	314	101	..	..	119	115	95	96	65	76	88
Spain	186	94x	86x	98	96	312	402	106	116	104	105	100	100	98	107	120
Sri Lanka	136	91	80	93	87	201	50	125	112	106	104	..	..	98	71	79
Sudan	42	43	17	58	35	258	80	29	11	61	48	59y	52y	94	24	19
Suriname	104	92	84	95	91	680	141	113	106	129x	125x	..	..	..	50x	58x
Swaziland	53	64	57	78	76	163	20	58	58	125	119	95	96	78	53	51
Sweden	189	..	..	..	..	879	475	95	96	100	100	100	100	98	99	100
Switzerland	186	..	..	..	..	841	416	118	118	100	102	100	100	100	93	89
Syria	100	72	34	86	56	257	62	88	39	108	97	95	87	91	50	41
Tajikistan	61	..	..	100	100	..	..	..	..	91	88	..	..	..	83	75
Tanzania	29	66	34	79	57	26	2	33	16	71	69	47	48	83	6	5
TFYR Macedonia	108	..	..	..	..	182	166	..	..	88	87	86	84	99	55	56
Thailand	93	92	84	96	92	190	117	92	84	98	97	..	..	88	38	37
Togo	38	49	18	67	37	212	8	64	25	122	81	98	72	71	34	12
Tonga	123	..	..	..	99x	561	16	..	..	..	..	..	..	92	..	..

BEST COPY AVAILABLE

	Under-5 mortality rank	Adult literacy rate 1980 male	Adult literacy rate 1980 female	Adult literacy rate 1995 male	Adult literacy rate 1995 female	No. of sets per 1000 population 1994 radio	No. of sets per 1000 population 1994 television	Primary school enrolment ratio 1960 (gross) male	Primary school enrolment ratio 1960 (gross) female	Primary school enrolment ratio 1990-95 (gross) male	Primary school enrolment ratio 1990-95 (gross) female	Primary school enrolment ratio 1993-97 (net) male	Primary school enrolment ratio 1993-97 (net) female	% of primary school children reaching grade 5 1990-95	Secondary school enrolment ratio 1990-95 (gross) male	Secondary school enrolment ratio 1990-95 (gross) female
Trinidad and Tobago	**143**	97	93	99	97	491	317	111	108	94	94	83	94	95	74	78
Tunisia	**97**	61	32	79	55	199	81	88	43	123	113	98	95	92	58	53
Turkey	**82**	81	50	92	72	162	181	90	58	101	94	98	94	95	76	50
Turkmenistan	**58**	..	..	99x	97x	..	180	..	..	..	..	81y	80y	..	..	..
Tuvalu	**74**	..	..	..	..	310	..	..	..	..	..	..	..	96	..	..
Uganda	**30**	62	32	74	50	107	11	39	18	74	59	65y	63y	55	14	8
Ukraine	**121**	..	..	98	99	812	340	..	..	87	87	..	..	54	88	95
United Arab Emirates	**139**	72	64	79	80	312	107	..	..	112	108	84	82	98	86	97
United Kingdom	**164**	..	..	..	..	1429	439	92	92	114	114	100	100	..	93	95
United States	**163**	99x	99x	..	..	2122	817	..	..	107	106	96	97	99	98	97
Uruguay	**127**	94	95	97	98	606	232	117	117	110	109	95	95	96	74	88
Uzbekistan	**71**	..	..	100	100	81	190	..	..	78	76	83y	83y	..	99	87
Vanuatu	**77**	..	..	..	60x	294	13	..	..	105	107	76x	72x	61	23	18
Venezuela	**115**	86	82	92	90	443	164	73	74	93	96	87x	90x	78	29	41
Viet Nam	**85**	90	78	97	91	104	43	103	74	..	..	..	..	..	..	..
Yemen	**50**	14x	3x	53x	25x	32	28	..	..	118	47	73y	39y	..	37	9
Yugoslavia, Fed. Rep.	**127**	..	..	99	97	207	179	..	..	68	71	69x	70x	100	61	63
Zambia	**13**	65	43	86	71	83	27	54	36	85	79	76	75	..	31	19
Zimbabwe	**65**	83	68	90	80	86	27	82	65	119	111	91y	90y	90	49	39
Regional summaries																
Sub-Saharan Africa		51	30	66	47	147	26	47	24	81	67	61	55	67	27	22
Middle East and North Africa		55	27	70	47	256	99	65	34	99	85	85	76	91	62	51
South Asia		52	24	63	36	80	34	77	39	107	82	75	63	59	52	33
East Asia and Pacific		80	58	91	76	196	156	119	76	117	113	98	96	90	57	49
Latin America and Caribbean		82	77	88	85	349	170	74	70	107	105	89	90	74	52	56
CEE/CIS and Baltic States		92	81	98	96	379	308	100	86	98	96	95	94	89	84	82
Industrialized countries		98	96	98	96	1287	623	109	109	105	104	98	98	99	98	99
Developing countries		68	46	79	62	178	105	92	58	105	92	83	76	75	52	41
Least developed countries		47	24	60	38	96	10	48	23	78	62	64	55	58	22	13
World		74	56	81	66	359	197	95	64	105	93	85	79	77	58	50

Countries in each region are listed on page 122

Definitions of the indicators

Adult literacy rate – Percentage of persons aged 15 and over who can read and write.

Gross primary or secondary school enrolment ratio – The number of children enrolled in a level (primary or secondary), regardless of age, divided by the population of the age group which officially corresponds to the same level.

Net primary school enrolment ratio – The number of children enrolled in primary school, who belong to the age group that officially corresponds to primary schooling, divided by the total population of the same age group. Data from household surveys on children attending school have been used to fill blanks and to replace UNESCO reported data that are three years or more older than the survey data. Such data are identified by a 'y'.

Children reaching grade 5 of primary school – Percentage of the children entering the first grade of primary school who eventually reach grade 5.

Main data sources

Adult literacy – United Nations Educational, Scientific and Cultural Organization (UNESCO).

Radio and television – United Nations Educational, Scientific and Cultural Organization (UNESCO).

Net primary school enrolment – United Nations Educational, Scientific and Cultural Organization (UNESCO), Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys.

Gross school enrolment and reaching grade 5 – United Nations Educational, Scientific and Cultural Organization (UNESCO).

Notes

.. Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

y Indicates net primary school data derived from household surveys.

BEST COPY AVAILABLE

Table 5: Demographic indicators

	Under-5 mortality rank	Population (thousands) 1996		Population annual growth rate (%)		Crude death rate		Crude birth rate		Life expectancy		Total fertility rate	% of population urbanized	Average annual growth rate of urban population (%)	
		under 18	under 5	1965-80	1980-96	1970	1996	1970	1996	1970	1996	1996	1996	1965-80	1980-96
Afghanistan	4	9685	3734	1.9	1.6	27	21	52	52	37	45	6.9	20	5.3	3.3
Albania	88	1246	363	2.4	1.5	8	6	33	22	67	71	2.7	38	2.9	2.2
Algeria	92	13138	3900	3.0	2.7	16	6	49	30	53	68	4.0	57	4.0	4.3
Andorra	175	15	4	6.4	4.6	.	.	.	.	.	.	.	94	6.2	4.4
Angola	2	6049	2200	2.0	2.9	27	19	49	49	37	47	6.8	32	5.4	5.5
Antigua and Barbuda	127	23	7	0.6	0.5	.	6	26	17	67	75	.	36	0.3	0.8
Argentina	117	12130	3439	1.5	1.4	9	8	23	20	67	73	2.7	88	2.1	1.8
Armenia	108	1213	285	2.3	1.0	6	7	24	15	72	71	1.8	69	3.4	1.3
Australia	175	4601	1312	1.6	1.3	9	7	20	14	71	78	1.9	85	1.9	1.3
Austria	175	1721	463	0.3	0.4	13	10	15	11	70	77	1.4	64	0.2	0.4
Azerbaijan	85	2828	790	2.0	1.3	7	7	29	20	68	71	2.4	56	2.5	1.7
Bahamas	123	96	24	2.7	1.9	7	5	27	18	66	73	2.0	87	2.9	2.8
Bahrain	127	207	65	4.0	3.1	9	4	40	22	62	73	3.1	91	3.8	3.8
Bangladesh	44	57200	13377	2.8	1.9	21	10	48	27	44	57	3.2	19	6.7	5.2
Barbados	152	72	19	0.4	0.3	9	9	22	15	69	76	1.7	48	1.1	1.4
Belarus	139	2655	584	0.8	0.4	9	12	17	11	71	70	1.5	72	3.4	1.9
Belgium	164	2166	584	0.3	0.2	12	11	15	11	71	77	1.6	97	0.4	0.3
Belize	85	106	33	2.1	2.5	8	4	40	32	66	74	3.8	47	1.7	2.2
Benin	31	3050	1024	2.4	3.0	25	13	53	43	43	54	6.0	39	7.6	5.2
Bhutan	36	887	306	2.0	2.1	23	14	43	41	40	52	5.9	6	4.4	5.2
Bolivia	51	3556	1160	2.4	2.2	20	9	45	34	46	61	4.5	62	3.2	4.1
Bosnia and Herzegovina	143	933	205	0.9	0.5	7	7	23	11	66	73	1.4	43	3.9	0.7
Botswana	80	745	237	3.3	3.1	15	12	50	36	52	52	4.6	63	12.5	12.0
Brazil	79	60228	15626	2.4	1.8	10	7	35	20	59	67	2.3	79	4.3	2.9
Brunei Darussalam	154	118	35	4.2	2.8	7	3	36	23	67	75	2.8	70	5.1	3.7
Bulgaria	136	1903	433	0.5	0.3	9	13	16	10	71	71	1.5	69	2.4	0.4
Burkina Faso	23	5821	2054	2.3	2.8	25	18	53	46	40	46	6.7	16	5.6	6.9
Burundi	17	3292	1130	1.7	2.6	20	18	44	44	44	46	6.4	8	6.2	6.3
Cambodia	19	4822	1564	0.4	2.9	21	13	42	35	43	53	4.6	21	1.3	6.2
Cameroon	51	6879	2322	2.6	2.8	21	12	45	40	44	56	5.4	46	6.9	5.2
Canada	164	7185	2003	1.5	1.2	7	7	17	13	73	79	1.6	77	1.7	1.3
Cape Verde	65	190	59	1.6	2.0	12	8	41	32	57	66	3.7	56	3.4	7.4
Central African Rep	21	1626	537	2.1	2.3	22	17	43	38	42	49	5.1	40	4.0	3.1
Chad	27	3241	1127	2.0	2.3	26	18	45	42	38	47	5.6	23	6.9	3.5
Chile	149	4961	1465	1.8	1.6	10	6	30	20	62	75	2.5	84	2.6	1.8
China	82	378019	101412	2.1	1.3	9	7	33	17	61	69	1.8	31	2.8	4.2
Colombia	104	14640	4303	2.4	2.0	9	6	37	24	61	71	2.8	73	3.6	2.8
Comoros	39	336	112	3.1	3.1	19	11	50	42	47	57	5.7	31	5.5	4.9
Congo	48	1392	490	2.7	2.9	20	15	46	43	46	51	6.0	59	4.3	5.2
Congo, Dem. Rep	12	25140	9084	2.9	3.4	20	14	48	46	45	53	6.4	29	3.5	3.5
Cook Islands	108	8	2	0.4	0.3	.	.	.	.	.	.	.	63	0.0	1.1
Costa Rica	146	1424	422	2.9	2.7	7	4	35	25	67	77	3.0	50	3.7	3.6
Côte d'Ivoire	25	7192	2239	4.0	3.4	20	14	52	38	44	51	5.3	44	6.7	4.8
Croatia	154	1034	245	0.4	0.2	10	12	15	11	69	72	1.6	56	2.8	0.9
Cuba	159	2867	776	1.5	0.8	7	7	29	14	70	76	1.6	76	2.6	1.5
Cyprus	159	226	63	0.3	1.3	10	8	20	17	71	77	2.3	54	1.6	2.4
Czech Rep	164	2400	585	0.4	0.0	13	12	16	11	70	73	1.5	66	2.1	0.2
Denmark	175	1108	341	0.5	0.1	10	12	16	12	73	75	1.9	85	1.0	0.3
Djibouti	24	292	96	6.4	4.9	23	15	48	39	40	50	5.5	82	8.4	5.6
Dominica	133	25	7	0.8	0.3	11	6	26	23	.	73	.	69	2.8	0.3
Dominican Rep	74	3255	953	2.7	2.1	11	5	42	25	58	71	2.9	63	5.1	3.4
Ecuador	88	4973	1455	2.9	2.4	12	6	42	26	58	70	3.2	60	4.5	3.9
Egypt	58	27791	7800	2.2	2.3	17	7	40	27	51	65	3.5	45	2.7	2.5
El Salvador	88	2565	771	2.7	1.5	12	6	44	29	57	69	3.2	45	3.2	2.1
Equatorial Guinea	18	202	71	1.5	4.0	25	17	42	42	40	49	5.6	44	1.2	6.9
Eritrea	41	1650	569	2.6	2.0	21	15	47	41	43	50	5.5	19	4.8	3.6
Estonia	145	358	73	0.9	0.0	11	13	15	10	70	69	1.4	73	1.7	0.3
Ethiopia	16	30615	11257	2.4	2.9	24	17	50	48	40	49	7.0	16	4.5	5.6

BEST COPY AVAILABLE

	Under-5 mortality rank	Population (thousands) 1996		Population annual growth rate (%)		Crude death rate		Crude birth rate		Life expectancy		Total fertility rate	% of population urbanized	Average annual growth rate of urban population (%)	
		under 18	under 5	1965-80	1980-96	1970	1996	1970	1996	1970	1996	1996	1996	1965-80	1980-96
Fiji	121	326	87	2.1	1.4	7	5	35	23	64	72	2.8	41	3.1	1.9
Finland	189	1170	326	0.3	0.4	10	10	15	12	70	76	1.8	63	2.4	0.8
France	175	13492	3563	0.7	0.5	11	9	17	12	72	79	1.7	75	1.3	0.6
Gabon	28	487	167	2.2	2.9	21	15	32	37	44	55	5.3	51	5.5	5.5
Gambia	49	535	189	3.1	3.6	28	18	49	41	36	46	5.3	30	5.5	6.2
Georgia	113	1529	405	0.8	0.4	10	9	19	14	68	73	2.0	59	1.7	1.3
Germany	175	15836	3978	0.2	0.3	12	11	14	9	71	76	1.3	87	0.6	0.6
Ghana	47	9110	2987	2.1	3.1	17	11	46	39	49	57	5.4	36	3.3	4.1
Greece	161	2168	517	0.8	0.5	8	10	17	10	72	78	1.4	59	2.1	0.7
Grenada	104	33	10	0.6	0.2	.	.						37	0.2	1.0
Guatemala	74	5563	1824	2.8	2.9	15	7	45	37	52	66	5.0	39	3.4	3.2
Guinea	11	4027	1462	1.6	3.3	28	19	52	49	37	46	6.7	30	4.9	6.0
Guinea-Bissau	6	523	181	2.8	2.0	27	21	41	41	36	44	5.5	22	3.9	3.6
Guyana	56	315	92	1.1	0.6	11	8	38	23	60	64	2.4	36	1.4	1.6
Haiti	34	3389	1091	1.7	1.9	19	13	39	34	47	54	4.7	32	3.7	3.9
Holy See	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.
Honduras	97	2924	939	3.1	3.1	15	6	48	35	53	69	4.5	44	5.1	4.6
Hungary	152	2250	561	0.4	0.4	11	15	15	11	69	69	1.5	65	1.8	0.4
Iceland	186	78	23	1.1	1.1	7	7	22	17	74	79	2.2	92	1.6	1.3
India	46	382891	111216	2.2	2.0	17	9	39	26	49	62	3.2	27	3.6	3.0
Indonesia	67	77807	21884	2.3	1.8	18	8	40	24	48	64	2.7	36	4.6	4.9
Iran	96	35706	11348	3.1	3.6	16	6	45	35	55	69	4.9	60	4.9	4.8
Iraq	39	10116	3158	3.3	2.9	16	9	48	37	55	61	5.4	75	5.0	3.8
Ireland	164	1039	241	1.1	0.3	11	9	22	13	71	76	1.9	58	2.0	0.5
Israel	161	1950	568	2.8	2.4	7	6	26	21	71	77	2.8	90	3.4	2.5
Italy	164	10492	2686	0.5	0.1	10	10	17	9	72	78	1.2	67	1.0	0.1
Jamaica	154	924	281	1.3	1.0	8	6	35	22	67	74	2.5	54	2.7	1.9
Japan	175	24730	6178	1.1	0.4	7	8	19	10	72	80	1.5	78	1.9	0.6
Jordan	117	2789	960	2.7	4.0	18	5	51	38	54	69	5.3	72	4.4	5.2
Kazakstan	84	5890	1519	1.5	0.7	9	8	26	19	64	68	2.4	60	2.4	1.4
Kenya	55	14739	4419	3.6	3.2	18	11	53	37	50	54	5.0	30	7.7	7.0
Kiribati	61	37	12	2.0	1.7	.	9		28	49	58		36	5.0	2.6
Korea, Dem. People's Rep.	108	6886	2311	2.5	1.5	10	6	40	21	60	72	2.1	62	4.1	2.0
Korea, Rep. of	164	12646	3387	1.9	1.1	10	6	30	15	60	72	1.7	82	5.7	3.4
Kuwait	147	756	187	7.1	1.3	6	2	47	22	66	76	2.9	100	8.1	2.0
Kyrgyzstan	80	1904	564	2.3	1.3	11	7	31	26	62	68	3.3	39	2.7	1.4
Lao People's Dem. Rep.	35	2574	917	1.8	2.8	23	14	44	45	40	53	6.7	21	5.0	5.7
Latvia	133	609	133	0.7	0.1	11	14	14	10	70	68	1.5	73	1.6	0.4
Lebanon	88	1223	376	1.4	0.9	11	7	35	25	64	69	2.9	87	4.1	2.0
Lesotho	32	1010	326	2.3	2.6	20	11	43	36	48	58	5.0	25	7.3	6.5
Liberia	5	1107	331	3.0	1.1	21	19	49	48	46	48	6.5	48	6.1	3.1
Libya	70	2896	987	4.2	3.8	16	7	49	41	52	65	6.1	86	10.4	5.2
Liechtenstein	164	7	2	2.2	1.3	.	.	.	.	.	.	.	19	1.5	1.1
Lithuania	139	957	229	0.9	0.5	9	12	17	11	71	70	1.6	72	3.0	1.6
Luxembourg	164	88	26	0.6	0.8	12	10	13	13	70	76	1.7	90	2.1	1.6
Madagascar	21	8185	2761	2.6	3.3	19	10	47	42	45	58	5.8	27	5.3	5.8
Malawi	P	5266	1868	2.9	2.9	25	22	56	49	40	41	6.8	14	7.1	5.6
Malaysia	149	8916	2668	2.5	2.5	10	5	37	26	61	72	3.4	54	4.7	4.1
Maldives	61	140	47	2.5	3.2	17	8	40	42	50	64	6.8	27	6.6	4.5
Mali	7	5995	2183	2.2	3.0	26	18	51	48	38	47	6.8	28	4.8	5.5
Malta	154	98	26	0.4	0.8	9	8	17	14	70	77	2.1	80	1.2	1.3
Marshall Islands	54	26	8	3.4	3.0	.	.						70	2.4	4.3
Mauritania	15	1157	380	2.3	2.6	22	13	45	39	43	53	5.1	53	9.7	6.7
Mauritius	123	377	111	1.7	1.0	7	7	29	20	62	71	2.3	41	2.6	0.7
Mexico	102	38611	11234	3.0	2.0	10	5	44	25	61	72	2.9	74	4.2	2.6
Micronesia, Fed. States of	116	58	19	3.1	2.6	.	7		33	58			29	3.7	3.4
Moldova, Rep. of	102	1382	327	1.2	0.6	10	11	19	14	65	68	1.9	52	3.7	2.3
Monaco	175	7	2	1.4	1.1	.	.						100	1.4	1.

BEST COPY AVAILABLE

Table 5: Demographic indicators

	Under-5 mortality rank	Population (thousands) 1996		Population annual growth rate (%)		Crude death rate		Crude birth rate		Life expectancy		Total fertility rate	% of population urbanized	Average annual growth rate of urban population (%)	
		under 18	under 5	1965-80	1980-96	1970	1996	1970	1996	1970	1996	1996	1996	1965-80	1980-96
Mongolia	67	1135	314	2.8	2.6	14	7	42	28	53	65	3.4	61	4.2	3.6
Morocco	64	11526	3375	2.5	2.1	17	7	47	26	52	66	3.3	53	4.2	3.6
Mozambique	9	9114	3193	2.5	2.4	22	18	46	43	42	47	6.2	35	9.5	8.6
Myanmar	25	19055	5675	2.2	1.9	17	10	40	28	49	59	3.4	26	3.1	2.5
Namibia	60	767	252	2.6	2.7	18	12	43	36	48	56	5.0	37	4.6	5.7
Nauru	104	5	2	2.2	2.8								100	2.2	2.8
Nepal	42	10887	3593	2.3	2.6	22	12	45	37	42	56	5.1	11	6.5	5.7
Netherlands	175	3394	976	0.9	0.6	8	9	17	12	74	78	1.6	89	1.2	0.6
New Zealand	164	988	292	1.1	0.9	9	8	22	16	72	77	2.1	86	1.5	1.1
Nicaragua	73	2130	659	3.1	2.6	14	6	48	34	54	68	4.0	63	4.6	3.6
Niger	1	5197	1931	2.8	3.3	26	18	58	51	38	48	7.2	19	6.9	5.8
Nigeria	14	59722	21052	2.6	2.9	21	14	46	43	43	52	6.1	41	5.7	5.5
Niue	-	1	0										50		
Norway	175	1000	298	0.6	0.4	10	11	17	14	74	77	1.9	73	2.0	0.6
Oman	139	1233	444	3.9	4.4	21	4	50	44	47	70	7.2	78	14.6	10.1
Pakistan	33	68346	22773	2.7	3.1	19	8	48	37	49	63	5.2	35	3.8	4.5
Palau	97	8	3	2.7	2.2								71	3.1	2.5
Panama	133	1040	305	2.7	2.0	8	5	37	23	65	74	2.7	56	3.5	2.6
Papua New Guinea	44	2014	637	2.4	2.2	18	10	42	33	46	57	4.8	16	8.6	3.6
Paraguay	100	2361	743	2.7	2.9	9	6	37	32	66	69	4.3	53	3.6	4.4
Peru	72	10074	2901	2.8	2.0	14	7	42	26	54	68	3.1	71	4.2	2.6
Philippines	93	30923	9602	2.7	2.3	10	6	39	29	57	68	3.7	55	3.9	4.7
Poland	147	10589	2422	0.8	0.5	8	11	17	12	70	71	1.7	64	1.8	1.1
Portugal	164	2146	557	0.4	0.0	11	11	20	11	67	75	1.5	36	1.8	1.3
Qatar	132	175	50	7.9	5.6	13	4	34	19	61	71	3.9	92	8.6	6.0
Romania	117	5646	1195	1.0	0.1	9	11	20	11	69	70	1.4	56	2.8	1.0
Russian Federation	117	37115	7389	0.6	0.4	9	14	15	10	69	65	1.4	76	1.8	1.0
Rwanda	19	2880	950	3.2	0.3	21	27	53	43	44	36	6.2	6	6.8	1.9
Saint Kitts and Nevis	93	15	4	-0.7	-0.4	11	12	-	20	-	69	-	34	0.4	-0.8
Saint Lucia	127	51	15	1.3	1.4	-	6	41	28	62	71	-	38	1.0	1.4
Saint Vincent/Grenadines	123	40	12	1.0	0.9	-	7	-	22	63	72	-	50	5.4	4.6
Samoa	77	75	20	1.2	0.4	12	6	44	27	57	69	3.9	22	1.9	0.5
San Marino	149	5	1	1.4	1.1	-	-	-	-	-	-	-	96	4.2	2.2
Sao Tome and Principe	57	71	25	2.2	2.3		7		35		68		44	5.3	4.4
Saudi Arabia	108	9033	2977	4.6	4.2	18	4	48	35	52	71	6.0	84	8.2	5.7
Senegal	36	4359	1470	2.8	2.7	25	15	49	42	39	51	5.8	44	3.4	4.0
Seychelles	136	39	13	2.0	1.0	-	7	-	22	-	72	-	55	4.9	3.1
Sierra Leone	3	2163	765	1.9	1.8	30	27	49	47	34	37	6.2	34	5.5	4.0
Singapore	189	888	294	1.7	2.1	5	5	23	16	69	77	1.8	100	1.7	2.1
Slovakia	154	1468	348	0.9	0.4	10	11	19	12	70	71	1.6	59	3.1	1.3
Slovenia	175	426	92	0.8	0.3	10	11	17	10	70	73	1.3	52	3.4	0.7
Solomon Islands	113	199	65	3.4	3.4	10	4	46	37	60	71	5.1	18	4.6	6.6
Somalia	10	5308	1941	3.1	2.4	24	17	50	50	40	48	7.0	26	3.9	3.4
South Africa	69	18378	5761	2.6	2.3	14	8	39	30	53	65	3.9	50	2.7	2.5
Spain	186	8172	1935	1.1	0.3	9	9	20	10	72	78	1.2	77	2.2	0.7
Sri Lanka	136	6382	1588	1.9	1.3	8	6	30	18	65	73	2.1	22	2.4	1.5
Sudan	42	13026	3999	2.8	2.4	21	12	47	34	43	54	4.7	32	5.6	5.4
Suriname	104	173	50	0.4	1.2	8	6	37	23	63	71	2.5	50	0.1	1.9
Swaziland	53	439	144	2.8	2.8	19	10	48	37	46	59	4.6	32	9.5	6.5
Sweden	189	1963	584	0.5	0.4	10	11	14	12	74	78	1.9	83	1.0	0.4
Switzerland	186	1500	423	0.5	0.8	9	9	16	11	73	78	1.5	61	1.0	1.3
Syria	100	7485	2103	3.3	3.2	14	5	47	31	56	68	4.2	53	4.3	4.0
Tajikistan	61	2842	835	3.0	2.5	10	7	40	31	63	67	4.0	32	2.9	2.2
Tanzania	29	16154	5479	3.0	3.2	19	14	50	42	45	51	5.6	25	9.9	6.5
TFYR Macedonia	108	636	164	1.3	1.2	8	7	25	15	66	72	2.0	60	3.2	1.9
Thailand	93	19529	4830	2.8	1.4	10	6	38	17	58	69	1.8	20	4.7	2.5
Togo	38	2197	766	3.2	3.0	20	15	46	43	44	50	6.2	31	7.9	4.9
Tonga	123	41	12	1.5	0.4	-	6		28		69	-	42	2.6	3.9

BEST COPY AVAILABLE

	Under-5 mortality rank	Population (thousands) 1996		Population annual growth rate (%)		Crude death rate		Crude birth rate		Life expectancy		Total fertility rate	% of population urbanized	Average annual growth rate of urban population (%)	
		under 18	under 5	1965-80	1980-96	1970	1996	1970	1996	1970	1996	1996	1996	1965-80	1980-96
Trinidad and Tobago	**143**	467	108	1.3	1.1	7	6	28	17	66	73	2.2	72	1.2	2.0
Tunisia	**97**	3742	1044	2.2	2.2	14	6	39	24	54	69	3.0	63	4.0	3.4
Turkey	**82**	22986	6388	2.4	2.1	13	7	37	22	56	68	2.6	71	4.0	5.0
Turkmenistan	**58**	1887	570	2.8	2.3	11	8	38	30	60	65	3.7	45	2.8	2.1
Tuvalu	**74**	4	1	1.9	1.4	.	.	.	.	.	.	.	40	4.6	4.3
Uganda	**30**	11239	4066	3.3	2.7	19	21	50	51	46	41	7.1	13	5.3	5.1
Ukraine	**121**	12377	2771	0.7	0.2	9	14	15	10	71	69	1.5	71	2.0	1.0
United Arab Emirates	**139**	781	213	13.0	5.0	11	3	36	19	61	75	3.6	84	15.6	6.0
United Kingdom	**164**	13333	3681	0.2	0.2	12	11	16	12	72	77	1.7	89	0.4	0.2
United States	**163**	70382	20014	1.0	1.0	9	9	17	14	71	76	2.0	76	1.1	1.2
Uruguay	**127**	941	263	0.5	0.6	10	10	21	17	69	73	2.3	90	0.9	1.0
Uzbekistan	**71**	10614	3162	3.0	2.3	10	7	36	29	63	68	3.6	41	3.9	2.4
Vanuatu	**77**	86	27	3.0	2.5	14	6	46	34	53	67	4.5	19	6.4	2.8
Venezuela	**115**	9411	2770	3.4	2.4	7	5	38	26	65	72	3.1	86	4.5	3.0
Viet Nam	**85**	32318	9558	2.2	2.1	15	7	38	26	49	67	3.1	19	3.3	2.2
Yemen	**50**	8498	3084	2.3	4.0	23	11	53	48	41	57	7.6	34	6.3	7.4
Yugoslavia, Fed. Rep.	**127**	2678	655	0.8	0.5	9	10	19	13	68	72	1.8	57	3.0	1.8
Zambia	**13**	4562	1483	3.1	2.3	19	18	49	43	46	43	5.6	43	6.6	2.8
Zimbabwe	**65**	5822	1951	3.1	3.0	16	14	50	38	50	49	4.8	33	6.0	5.3

Regional summaries

Sub-Saharan Africa	298349	103119	2.7	2.9	21	15	48	43	44	51	5.9	32	5.2	5.0
Middle East and North Africa	150639	46229	2.9	3.0	17	7	45	32	52	65	4.5	56	4.8	4.3
South Asia	536418	156634	2.3	2.1	18	9	41	28	48	61	3.5	27	3.8	3.4
East Asia and Pacific	598624	165346	2.2	1.5	11	7	35	19	58	68	2.1	33	3.4	4.1
Latin America and Caribbean	189383	53761	2.5	1.9	10	6	37	23	60	69	2.8	74	3.8	2.7
CEE/CIS and Baltic States	137929	33210	1.1	0.7	9	11	20	14	66	68	1.9	67	2.3	1.4
Industrialized countries	191260	51706	0.8	0.6	10	9	17	12	72	77	1.7	78	1.2	0.8
Developing countries	1827055	540175	2.3	2.0	14	9	38	26	53	62	3.2	38	3.9	3.8
Least developed countries	298758	97112	2.5	2.5	22	14	48	40	43	51	5.3	23	5.4	5.0
World	2102602	610005	2.0	1.7	13	9	32	23	56	63	2.9	46	2.8	2.8

Countries in each region are listed on page 122.

Definitions of the indicators

Life expectancy at birth – The number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.

Crude death rate – Annual number of deaths per 1,000 population.

Crude birth rate – Annual number of births per 1,000 population.

Total fertility rate – The number of children that would be born per woman if she were to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates.

Urban population – Percentage of population living in urban areas as defined according to the national definition used in the most recent population census.

Main data sources

Life expectancy – United Nations Population Division.

Child population – United Nations Population Division.

Crude death and birth rates – United Nations Population Division.

Fertility – United Nations Population Division.

Urban population – United Nations Population Division.

Notes

. Data not available.

x Indicates data that refer to years or periods other than those specified in the column headings, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Table 6: Economic indicators

	Under-5 mortality rank	GNP per capita (US$) 1995	GNP per capita average annual growth rate (%) 1965-80	GNP per capita average annual growth rate (%) 1985-95	Annual rate of inflation (%) 1985-95	% of population below $1 a day 1990-96	% of central government expenditure allocated to (1990-96) health	education	defence	ODA inflow in millions US$ 1995	ODA inflow as a % of recipient GNP 1995	Debt service as a % of exports of goods and services 1970	1995
Afghanistan	4	250x	0.6	.	.	.	.	.	.	214	5	.	.
Albania	88	670	.	-5.0x	27	.	6	2	7	179	6	.	1
Algeria	92	1600	4.2	-2.4	23	2x	.	.	.	310	1	3	37
Andorra	175	c	.	.	.	.	.	.	.	.	.	.	.
Angola	2	410	.	-6.1	170	.	6x	15x	34x	423	10	.	15
Antigua and Barbuda	127	6980x	.	2.7	4	.	.	.	.	2	0	.	2
Argentina	117	8030	1.7	1.8	256	.	2	5	7	222	0	22	26
Armenia	108	730	.	-15.1	183	.	.	.	.	213	8	.	1
Australia	175	18720	2.2	1.4	4	.	13	8	7	.	.	.	.
Austria	175	26890	4.0	1.9	3	.	14	10	2	.	.	.	.
Azerbaijan	85	480	.	-16.3	279	.	.	.	.	109	3	.	1
Bahamas	123	11940	.	0.8	3	.	15	19	3	4	0	.	.
Bahrain	127	7840	.	0.2	0	.	9	13	17	49	1	.	2
Bangladesh	44	240	0.3	2.1	6	.	5x	11x	10x	1268	4	0	15
Barbados	152	6560	.	0.8	3	.	.	.	.	1	0	.	10
Belarus	139	2070	.	-5.2	309	.	2	18	4	.	.	.	2
Belgium	164	24710	3.6	2.2	3	.	7x	12x	5x	.	.	.	.
Belize	85	2630	.	3.9	4	.	13	20	5	16	4	.	.
Benin	31	370	-0.3	-0.3	3	.	6x	31x	17x	276	14	2	13
Bhutan	36	420	.	4.9	8	.	8	10	.	73	25	.	10
Bolivia	51	800	1.7	1.8	18	7	6	19	8	692	12	11	26
Bosnia and Herzegovina	143	a	.	.	.	.	.	.	.	.	.	.	.
Botswana	80	3020	9.9	6.1	12	35x	5	21	12	92	2	1	4
Brazil	79	3640	6.3	-0.8	875	29x	5	3	3	366	0	12	29
Brunei Darussalam	154	25160	.	.	0	.	.	.	.	4	0	.	.
Bulgaria	136	1330	.	-2.8	46	3	3	4	6	.	.	.	11
Burkina Faso	23	230	1.7	-0.2	3	.	7	17	14	483	20	4	17
Burundi	17	160	-2.4	-1.3	9	.	4x	16x	16x	288	29	4	22
Cambodia	19	270	.	-2.0	71	.	.	.	.	567	21	.	2
Cameroon	51	650	-2.4	-6.6	5	.	5	18	9	444	5	3	17
Canada	164	19380	3.3	0.4	3	.	5	3	6	.	.	.	.
Cape Verde	65	960	.	2.1	7	.	.	.	.	111	30	.	.
Central African Rep	21	340	-0.8	-2.4	4	.	.	.	.	161	14	5	3
Chad	27	180	-1.9	-0.6	3	.	8x	8x	.	237	21	4	7x
Chile	149	4160	0.0	6.1	18	15	12	15	9	159	0	19	15
China	82	620	4.1	8.3	9	29	0	3	12	3521	0	0x	10
Colombia	104	1910	3.7	2.6	25	7	5	19	9	231	0	12	27
Comoros	39	470	.	-1.4	4	.	.	.	.	43	18	.	2
Congo	48	680	-2.7	-3.2	2	.	.	.	.	125	7	11	11
Congo, Dem. Rep	12	120	-1.3	-8.5	.	.	1	1	4	189	4	5	6x
Cook Islands	108	1550x	.	.	.	.	.	.	.	13	16	.	.
Costa Rica	146	2610	3.3	2.8	18	19x	21	17	.	25	0	10	15
Côte d'Ivoire	25	660	-2.8	-4.3	4	18x	4x	21x	4x	1200	13	7	16
Croatia	154	3250	.	.	.	.	15	7	21	.	.	.	2
Cuba	159	1170x	.	.	.	.	23x	10x	.	64	0x	.	.
Cyprus	159	10260x	.	4.6	4	.	6	11	3	22	0	.	.
Czech Rep	164	3870	.	-1.8	12	3	17	12	6	.	.	.	8
Denmark	175	29890	2.2	1.5	3	.	1	9	4	.	.	.	.
Djibouti	24	780x	.	.	.	.	.	.	.	103	.	.	7
Dominica	133	2990	.	4.1	4	.	.	.	.	24	11	.	6
Dominican Rep	74	1460	3.8	2.1	26	20x	10	12	5	124	1	4	16
Ecuador	88	1390	5.4	-0.8	46	30	11	18	13	235	1	9	21
Egypt	58	790	2.8	1.1	16	8	2	12	9	2017	4	26	21
El Salvador	88	1610	-1.5	2.8	15	.	8	13	9	304	3	4	13
Equatorial Guinea	18	380	.	-2.3	4	.	.	.	.	33	22	.	1
Eritrea	41	100x	.	.	.	.	.	.	.	145	46x	.	.
Estonia	145	2860	.	-4.3	77	6	17	9	3	.	.	.	0
Ethiopia	16	100	0.4	-0.3	6	34x	5	14	20	876	15	11	20

BEST COPY AVAILABLE

	Under-5 mortality rank	GNP per capita (US$) 1995	GNP per capita average annual growth rate (%) 1965-80	GNP per capita average annual growth rate (%) 1985-95	Annual rate of inflation (%) 1985-95	% of population below $1 a day 1990-96	% of central government expenditure allocated to (1990-96) health	education	defence	ODA inflow in millions US$ 1995	ODA inflow as a % of recipient GNP 1995	Debt service as a % of exports of goods and services 1970	1995
Fiji	121	2440	-	2.0	5	-	9	18	6	43	2	-	4
Finland	189	20580	3.6	-0.2	4	.	3	11	4	.	.	.	.
France	175	24990	3.7	1.5	3	.	16	7	6	.	.	.	.
Gabon	28	3490	5.6	8.2	5	.	.	.	.	143	4	6	13
Gambia	49	320	-	0.3	9	.	7	12	4	46	13	1	11
Georgia	113	440	.	-17.0	310	.	.	.	.	209	9	.	4
Germany	175	27510	3.0x	1.9x	3	.	17	1	7	.	.	.	.
Ghana	47	390	-0.8	1.4	29	.	7	22	5	644	10	5	15
Greece	161	8210	4.8	1.3	15	.	7	9	9	.	.	9	17
Grenada	104	2980	.	.	5	.	10	17	.	10	4	.	13
Guatemala	74	1340	3.0	0.3	19	53x	11	19	15	213	1	7	11
Guinea	11	550	1.3	1.4	17	26	3x	11x	29x	392	11	.	13
Guinea-Bissau	6	250	-2.7	2.0	63	87	1x	3x	4x	119	45	.	30
Guyana	56	590	.	0.6	51	.	.	.	.	88	18	.	19
Haiti	34	250	0.9	-5.2	15	.	.	.	.	733	41	5	14
Holy See	.	.	.	.	.	.	.	.	.	.	.	.	.
Honduras	97	600	1.1	0.1	14	47	10x	19x	7x	411	12	3	32
Hungary	152	4120	5.1	1.0	20	1	8	3	4	.	.	.	31
Iceland	186	24950	-	1.0	12	.	23	12	.	.	.	.	.
India	46	340	1.5	3.2	10	53	2	2	14	1738	1	21	23
Indonesia	67	980	5.2	6.0	9	15	3	10	7	1389	1	7	23
Iran	96	1033x	2.9	1.5	24	.	9	16	6	183	0	.	19x
Iraq	39	1036x	.	.	.	.	.	.	.	326	2x	.	.
Ireland	164	14710	2.8	5.2	3	.	14	13	3	.	.	.	.
Israel	161	15920	3.7	2.5	17	.	9	13	18	336	0	3	.
Italy	164	19020	3.2	1.8	6	.	11x	8x	4x	.	.	.	.
Jamaica	154	1510	-0.1	3.6	28	5	7x	11x	8x	108	3	3	17
Japan	175	39640	5.1	2.9	1	.	2	6	4	.	.	.	.
Jordan	117	1510	5.8x	4.5	7	3	8	16	21	536	8	4	21
Kazakstan	84	1330	.	8.6	307	.	.	.	.	58	0	.	3
Kenya	55	280	3.1	0.1	13	50	5	19	6	707	9	6	23
Kiribati	61	920	.	0.6	4	.	.	.	.	15	21	.	.
Korea, Dem. People's Rep.	108	970x	.	.	.	.	.	.	.	14	0x	.	.
Korea, Rep. of	164	9700	7.3	7.7	7	.	1	21	17	58	0	20	3
Kuwait	147	17390	0.6x	1.1	-1	.	6	11	25	6	0	.	.
Kyrgyzstan	80	700	.	6.9	172	19	.	.	.	283	9	.	7
Lao People's Dem. Rep.	35	350	.	2.7	23	.	.	.	.	311	18	.	8x
Latvia	133	2270	.	-6.6	73	.	6	15	3	.	.	.	1
Lebanon	88	2660	.	2.7	46	.	.	.	.	108	2	.	16
Lesotho	32	770	6.8	1.2	13	50x	13	21	6	114	8	1	17
Liberia	5	490x	0.5	.	.	.	5x	11x	9x	121	11	8	.
Libya	70	5540x	0.0	.	.	.	.	.	.	7	0	.	.
Liechtenstein	164	c	.	.	.	.	.	.	.	.	.	.	.
Lithuania	139	1900	.	11.7	151	2	7	7	2	.	.	.	0
Luxembourg	164	41210	.	0.9	5	.	2	9	1	.	.	.	.
Madagascar	21	230	-0.4	2.2	18	72	6	11	5	301	9	32	7
Malawi	8	170	3.2	-0.7	22	.	7x	12x	5x	429	26	8	22
Malaysia	149	3890	4.7	5.7	3	6x	6	22	13	114	0	4	3
Maldives	61	990	.	5.9	9	.	8	16	.	55	22	.	.
Mali	7	250	2.1x	0.8	5	.	2x	9x	8x	542	22	1	7
Malta	154	7910x	.	5.1	3	.	11	12	2	9	0	.	.
Marshall Islands	54	1680x	.	.	5	.	.	.	.	39	41	.	.
Mauritania	15	460	-0.1	0.5	7	31x	4x	23x	.	220	21	3	19
Mauritius	123	3380	3.7	5.4	9	.	9	17	2	23	1	3	5
Mexico	102	3320	3.6	0.1	37	15	3	27	4	379	0	24	19
Micronesia, Fed. States of	116	2010	.	.	5	.	.	.	.	77	36	.	.
Moldova, Rep. of	102	920	.	-8.2	.	7	.	.	.	.	.	.	5
Monaco	175	c	.	.	.	.	.	.	.	.	.	.	.

BEST COPY AVAILABLE

Table 6: Economic indicators

	Under-5 mortality rank	GNP per capita (US$) 1995	GNP per capita average annual growth rate (%) 1965-80	1985-95	Annual rate of inflation (%) 1985-95	% of population below $1 a day 1990-96	% of central government expenditure allocated to (1990-96) health	education	defence	ODA inflow in millions US$ 1995	ODA inflow as a % of recipient GNP 1995	Debt service as a % of exports of goods and services 1970	1995
Mongolia	67	310	..	3.8	52	..	4	7	12	208	27	..	9x
Morocco	64	1110	2.7	0.9	5	1	3	18	14	494	2	8	39
Mozambique	9	80	..	3.6	52	..	5x	10x	35x	1102	81	..	58
Myanmar	25	220x	1.6	0.4	26	..	4	12	37	152	2x	18	15x
Namibia	60	2000	..	2.9	10	..	10	22	7	188	6	..	..
Nauru	104	..	..	..	..	..	..	..	..	..	..	..	..
Nepal	42	200	..	2.4	12	53	5	14	4	430	10	3	8
Netherlands	175	24000	2.7	1.9	2	..	15	11	4	..	..	..	..
New Zealand	164	14340	1.7	0.8	4	..	16	15	4	..	..	..	..
Nicaragua	73	380	0.7	-5.4	962	44	13	15	6	662	40	11	57
Niger	1	220	-2.5	-2.1	1	62	..	..	..	268	14	4	9x
Nigeria	14	260	4.2	1.2	33	29	1x	3x	3x	208	1	4	22
Niue	-	..	..	..	..	..	..	..	..	8	..	..	..
Norway	175	31250	3.6	1.7	3	..	4	7	7	..	..	..	..
Oman	139	4820	9.0	0.3	0	..	6	13	35	59	1	..	8
Pakistan	33	460	1.8	1.2	9	12	1	2	31	805	1	22	29
Palau	97	790x	..	..	..	..	..	..	..	142	..	..	..
Panama	133	2750	2.8	0.4	2	26x	18	17	5	50	1	8	8
Papua New Guinea	44	1160	..	2.3	5	..	8	15	4	372	7	1	10
Paraguay	100	1690	4.1	1.2	25	..	7	22	11	146	2	12	8
Peru	72	2310	0.8	-1.6	399	49	5	16	11	428	1	12	13
Philippines	93	1050	3.2	1.5	10	28x	3	16	11	884	1	8	16
Poland	147	2790	..	1.2	92	7	..	..	..	..	..	..	6
Portugal	164	9740	4.6	3.6	11	..	9x	11x	6x	..	..	7	16
Qatar	132	11600	..	4.2	..	..	..	..	..	3	0	..	..
Romania	117	1480	..	3.8	69	18	8	10	7	..	..	0x	4
Russian Federation	117	2240	..	-5.1	148	1	2	2	12	..	..	..	8
Rwanda	19	180	1.6	-5.4	11	46x	5x	26x	..	711	63	1	28
Saint Kitts and Nevis	93	5170	..	4.8	6	..	..	..	..	4	2	..	..
Saint Lucia	127	3370	..	3.9	3	..	..	..	..	47	9	..	..
Saint Vincent/Grenadines	123	2280	..	3.8	4	..	13	17	..	47	19	..	..
Samoa	77	1120	..	0.2	11	..	..	..	..	43	23	..	..
San Marino	149	..	..	..	..	..	..	..	..	..	..	..	..
Sao Tome and Principe	57	350	..	-2.1	40	..	..	..	..	78	174	..	17
Saudi Arabia	108	7040	4.0x	1.9	3	..	6x	14x	36x	21	0	..	1
Senegal	36	600	0.5	1.2	4	54	..	..	..	663	13	4	12
Seychelles	136	6620	..	4.2	3	..	8	12	4	13	3	..	7
Sierra Leone	3	180	0.7	-3.6	67	..	10	13	10	205	27	11	27
Singapore	189	26730	8.3	6.2	4	..	7	23	29	16	0	1	..
Slovakia	154	2950	..	-2.8	11	13	..	..	..	..	..	..	6
Slovenia	175	8200	..	..	..	..	..	..	..	..	..	..	3
Solomon Islands	113	910	..	3.2	12	..	..	..	..	47	14	..	..
Somalia	10	110x	-0.1	-2.3x	75	..	1x	2x	38x	191	20	2	7x
South Africa	69	3160	3.2	1.1	14	24	..	..	..	384	0	..	5
Spain	186	13580	4.1	2.6	6	..	6	4	3	..	..	..	..
Sri Lanka	136	700	2.8	2.6	12	4	6	10	15	553	4	11	11
Sudan	42	310x	-0.8	-0.6	63	..	..	..	..	225	3	11	0x
Suriname	104	880	..	-3.5	49	..	..	..	..	77	21	..	..
Swaziland	53	1170	..	1.4	12	..	..	..	..	54	5	..	2
Sweden	189	23750	2.0	0.1	6	..	0	5	6	..	..	..	..
Switzerland	186	40630	1.5	0.2	3	..	20x	3x	6x	..	..	..	..
Syria	100	1120	5.1	-0.9	16	..	3	9	28	347	2	11	3x
Tajikistan	61	340	..	-13.0	147	..	..	..	..	65	3	..	..
Tanzania	29	120	-0.8	-1.0	32	16	6x	8x	16x	875	24	1	16
TFYR Macedonia	108	860	..	..	..	..	..	..	..	..	..	..	7
Thailand	93	2740	4.4	0.4	5	0	8	22	14	853	1	3	3
Togo	38	310	1.7	-2.7	3	..	5x	20x	11x	188	15	3	5
Tonga	123	1630	..	0.5	8	..	7	13	..	38	22	..	..

BEST COPY AVAILABLE

	Under-5 mortality rank	GNP per capita (US$) 1995	GNP per capita average annual growth rate (%) 1965-80	1985-95	Annual rate of inflation (%) 1985-95	% of population below $1 a day 1990-96	% of central government expenditure allocated to (1990-96) health	education	defence	ODA inflow in millions US$ 1995	ODA inflow as a % of recipient GNP 1995	Debt service as a % of exports of goods and services 1970	1995
Trinidad and Tobago	**143**	3770	3.1	-1.7	7	..	..	..	..	26	1	5	16
Tunisia	**97**	1820	4.7	1.9	6	4	6	17	6	69	0	18	17
Turkey	**82**	2780	3.6	2.2	65	..	3	12	10	303	0	16	27
Turkmenistan	**58**	920	..	-9.6	381	5	..	..	..	26	1	..	4x
Tuvalu	**74**	650x	..	..	..	..	..	..	..	8	..	..	..
Uganda	**30**	240	2.2	2.7	66	50	2x	15x	26x	805	17	3	18
Ukraine	**121**	1630	..	-9.2	363	..	..	..	..	..	..	..	2x
United Arab Emirates	**139**	17400	..	-2.8	..	..	7	17	37	8	0	..	..
United Kingdom	**164**	18700	2.0	1.4	5	..	14	5	8	..	..	..	..
United States	**163**	26980	1.8	1.3	3	..	19	2	17	..	..	..	..
Uruguay	**127**	5170	2.5	3.1	71	..	6	7	7	81	0	22	22
Uzbekistan	**71**	970	..	-3.9	739	..	..	..	..	81	0	..	3
Vanuatu	**77**	1200	..	-1.1	6	..	..	..	..	46	23	..	..
Venezuela	**115**	3020	-2.3	0.5	38	12	10x	20x	6x	49	0	3	17
Viet Nam	**85**	240	..	4.2	88	..	..	..	..	826	5	..	4
Yemen	**50**	260	..	..	..	..	5	21	30	173	4	..	5
Yugoslavia, Fed. Rep.	**127**	b	..	..	..	..	..	..	..	..	..	..	..
Zambia	**13**	400	-1.2	-0.8	92	85	14	15	..	2029	56	6	24
Zimbabwe	**65**	540	1.7	-0.6	21	41	8x	24x	17x	490	8	2	20x

Regional summaries

Sub-Saharan Africa	501	-2.8	-0.9	20	36	5	14	10	17379	6	6	11
Middle East and North Africa	1710	-3.1	-0.9	14	..	6	15	21	5146	1	12	13
South Asia	345	1.4	2.8	10	47	2	3	16	5137	1	17	22
East Asia and Pacific	1043	4.9	7.4	9	26	2	12	14	9818	0	6	7
Latin America and Caribbean	3271	4.0	0.5	406	24	5	11	5	6026	0	13	21
CEE/CIS and Baltic States	2086	..	-3.3	139	4	4	7	10	..	..	..	9
Industrialized countries	25925	2.9	1.8	3	..	12	4	9	..	..	..	..
Developing countries	1101	3.7	2.9	141	32	4	11	12	45181	1	11	13
Least developed countries	220	-0.1	0.0	30	..	5	13	15	16465	14	6	14
World	4812	3.1	1.9	32	30	11	6	10	45377	1	11	12

Countries in each region are listed on page 122.

Definitions of the indicators

GNP per capita – Gross national product (GNP) is the sum of gross value added by all resident producers, plus any taxes that are not included in the valuation of output, plus net receipts of primary income from non-resident sources. GNP per capita is the gross national product, converted to United States dollars using the World Bank Atlas method, divided by the mid-year population.

% of population below $1 a day – Percentage of population living on less than $1 a day at 1985 international prices, adjusted for purchasing power parity.

ODA – Official development assistance.

Debt service – The sum of interest payments and repayments of principal on external public and publicly guaranteed long-term debts.

Main data sources

GNP per capita – World Bank.

% of population below $1 a day – World Bank.

Expenditure on health, education and defence – International Monetary Fund (IMF).

ODA – Organisation for Economic Co-operation and Development (OECD).

Debt service – World Bank.

Notes

a. Range US$765 or less.
b. Range US$766 to $3035.
c. Range US$3036 or more.

.. Data not available.
x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Table 7: Women

	Under-5 mortality rank	Life expectancy females as a % of males 1996	Adult literacy rate females as a % of males 1995	Enrolment ratios females as a % of males 1990-95		Contraceptive prevalence (%) 1990-97	% of pregnant women immunized against tetanus 1995-96	% of births attended by trained health personnel 1990-96	Maternal mortality rate 1990
				primary school	secondary school				
Afghanistan	**4**	102	32	51	34	2x	37	9x	1700
Albania	**88**	109		101	103			99x	65
Algeria	**92**	104	66	88	88	57	34	77	160
Andorra	**175**								
Angola	**2**	107	52x	92		1x	28	15x	1500
Antigua and Barbuda	**127**	92				53x		90x	
Argentina	**117**	110	100	99	107	74x	63	97	100
Armenia	**108**	110	99	107	113				50
Australia	**175**	108		99	104	76x		100	9
Austria	**175**	110		100	95	71x		100	10
Azerbaijan	**85**	112	99	96	98				22
Bahamas	**123**	110	99	103	100	62x	75x	100x	100
Bahrain	**127**	106	89	103	103	54x	54	97	60
Bangladesh	**44**	100	53	87	52	49	72	14	850
Barbados	**152**	107	99	101	89x	55x	100	98x	43
Belarus	**139**	117	99	97	105	50		100x	37
Belgium	**164**	108		101	101	79		100x	10
Belize	**85**	104	100x	96	113	47	88	77	
Benin	**31**	110	53	50	41	9x	75	45x	990
Bhutan	**36**	106	50	61x	29x	19	70	15	1600
Bolivia	**51**	107	84	91	85	45	52	47	650
Bosnia and Herzegovina	**143**	109							
Botswana	**80**	106	74	101	107	33x	61	78x	250
Brazil	**79**	113	100	96x	116x	77	45	68	220
Brunei Darussalam	**154**	107	89	94	109		50x	98	60
Bulgaria	**136**	110	99	95	106	76x		100x	27
Burkina Faso	**23**	104	30	65	50	8	27	42	930
Burundi	**17**	107	47	82	63	9x	33	19x	1300
Cambodia	**19**	106	66x	82	58		36	47x	900
Cameroon	**51**	106	69	90	69	16	12	64	550
Canada	**164**	108		98	100	73x		99x	6
Cape Verde	**65**	103	79	98	93	15x	4	30x	
Central African Rep	**21**	111	75	63x	35x	15	15	46	700
Chad	**27**	107	56	48	23	1x	50	15	1500
Chile	**149**	108	100	98	106	43x		98x	65
China	**82**	104	81	97	85	83	13	84	95
Colombia	**104**	107	100	102	119	72	57	85	100
Comoros	**39**	102	78	85	81	21	34	52	950
Congo	**48**	110	81				55		890
Congo, Dem. Rep	**12**	106	78	74	45	8	20		870
Cook Islands	**108**					50	64	99	
Costa Rica	**146**	107	100	98	109	75	90	93x	55
Côte d'Ivoire	**25**	106	60	76	52	11	22	45	810
Croatia	**154**	112	99	99	108		91		
Cuba	**159**	105	99	99	113	70x	61x	90x	95
Cyprus	**159**	107	93x	100	102		57x	100x	5
Czech Rep	**164**	109		100	104	69			15
Denmark	**175**	107		100	104	78x		100x	9
Djibouti	**24**	106	55	77	67		39	79x	570
Dominica	**133**	96				50x		96x	
Dominican Rep	**74**	105	100	101	138	64	96	96	110
Ecuador	**88**	107	96	98	104	57	25	64	150
Egypt	**58**	105	61	87	87	48	55	46	170
El Salvador	**88**	109	95	101	111	53	69	87	300
Equatorial Guinea	**18**	106	76				63	58x	820
Eritrea	**41**	106		80	68	8	23	21	1400
Estonia	**145**	117	100	97	98	70			41
Ethiopia	**16**	106	54	64	41	4	36	14x	1400

BEST COPY AVAILABLE

	Under-5 mortality rank	Life expectancy females as a % of males 1996	Adult literacy rate females as a % of males 1995	Enrolment ratios females as a % of males 1990-95		Contraceptive prevalence (%) 1990-97	% of pregnant women immunized against tetanus 1995-96	% of births attended by trained health personnel 1990-96	Maternal mortality rate 1990
				primary school	secondary school				
Fiji	**121**	107	95	99	102	32x	100	96x	90
Finland	**189**	110	.	100	118	80x	.	100	11
France	**175**	112	.	98	103	75	.	99	15
Gabon	**28**	108	72	.	.	.	4	80x	500
Gambia	**49**	107	47	71	52	12	92	44	1100
Georgia	**113**	112	99	99	93	.	.	.	33
Germany	**175**	110	.	101	99	75	.	99x	22
Ghana	**47**	105	71	84	64	20	9	44	740
Greece	**161**	107	97	100	97	.	.	97x	10
Grenada	**104**	.	.	.	.	54	80	81x	.
Guatemala	**74**	108	78	88	92	31	81	35	200
Guinea	**11**	102	44	49	33	2	43	31	1600
Guinea-Bissau	**6**	107	63	55x	44x	1x	43	27x	910
Guyana	**56**	110	99	98x	105x	0x	56	90x	.
Haiti	**34**	106	88	93	95	18	49	21	1000
Holy See	.	.	.	.	.	.	.	.	.
Honduras	**97**	107	100	101	128	47	99	88	220
Hungary	**152**	114	100	100	105	73x	.	99x	30
Iceland	**186**	105	.	96	100	.	.	100x	0
India	**46**	100	58	81	64	41	78	34	570
Indonesia	**67**	105	87	97	84	55	75	36	650
Iran	**96**	101	76	93	82	73	50	77	120
Iraq	**39**	105	63	85	64	18x	65	54x	310
Ireland	**164**	107	.	100	105	.	.	.	10
Israel	**161**	104	96x	100	107	.	.	99x	7
Italy	**164**	108	99	101	101	78x	.	.	12
Jamaica	**154**	107	110	99	113	62	82	82x	120
Japan	**175**	108	.	100	101	59	.	100x	18
Jordan	**117**	106	85	101	104	35	41	87	150
Kazakstan	**84**	116	99	100	103	59	.	99	80
Kenya	**55**	108	81	99	82	33	21	45	650
Kiribati	**61**	92	.	.	.	28	41	72	.
Korea, Dem. People's Rep.	**108**	109	.	94x	.	.	95	100x	70
Korea, Rep. of	**164**	112	98	101	99	79	.	98	130
Kuwait	**147**	105	91	100	98	35x	21	99x	79
Kyrgyzstan	**80**	114	99	101	106	.	.	.	110
Lao People's Dem. Rep.	**35**	106	64	75	61	19	45	.	650
Latvia	**133**	117	100	95	108	.	64	.	40
Lebanon	**88**	104	95	96	111	55x	.	45x	300
Lesotho	**32**	105	77	112	148	23	10	40x	610
Liberia	**5**	107	41	55x	39x	6x	35	58x	560
Libya	**70**	106	72	100	100	.	45x	76x	220
Liechtenstein	**164**	.	100x	.	.	.	.	.	.
Lithuania	**139**	117	99	98	105	.	.	.	35
Luxembourg	**164**	108	.	107	100	.	.	99x	0
Madagascar	**21**	105	53	96	100	17	33	57	490
Malawi	**8**	100	58	90	67	22	56	55	560
Malaysia	**149**	106	88	104	110	48x	79x	94	80
Maldives	**61**	97	100	98	100	10	93	90	.
Mali	**7**	107	58	64	55	7	32	24	1200
Malta	**154**	107	101	97	89	.	.	.	0
Marshall Islands	**54**	.	.	.	.	27	15x	.	.
Mauritania	**15**	108	52	81	58	4	28	40	930
Mauritius	**123**	110	91	99	103	75	79	97	120
Mexico	**102**	109	95	96	102	53x	69	77	110
Micronesia, Fed. States of	**116**	95	.	.	.	.	44	90x	.
Moldova, Rep. of	**102**	113	101	99	104	.	.	.	60
Monaco	**175**	.	.	.	.	.	.	.	.

BEST COPY AVAILABLE

Table 7: Women

	Under-5 mortality rank	Life expectancy females as a % of males 1996	Adult literacy rate females as a % of males 1995	Enrolment ratios females as a % of males 1990-95		Contraceptive prevalence (%) 1990-97	% of pregnant women immunized against tetanus 1995-96	% of births attended by trained health personnel 1990-96	Maternal mortality rate 1990
				primary school	secondary school				
Mongolia	67	105	87	106	140	-	-	99x	65
Morocco	64	106	54	74	74	50	100	40	610
Mozambique	9	107	40	72	60	4x	61	25x	1500
Myanmar	25	105	88	96	100	17	79	57x	580
Namibia	60	104	95x	101	121	29	75	68	370
Nauru	104	-	-	-	-	-	-	-	-
Nepal	42	98	34	68	50	29	11x	9	1500
Netherlands	175	107	-	102	91	80	-	100x	12
New Zealand	164	107	-	98	103	70x	-	99x	25
Nicaragua	73	108	103	103	118	49	96	61	160
Niger	1	109	33	60	56	4	31	15	1200
Nigeria	14	106	70	79	85	6	36	31	1000
Niue	-	-	-	-	-	-	-	-	-
Norway	175	108	-	100	97	76x	-	100x	6
Oman	139	106	65x	94	91	9x	98	87x	190
Pakistan	33	103	48	45	52	12	54	19	340
Palau	97	-	-	-	-	38x	55	90	-
Panama	133	106	99	96	108	56x	24	96	55
Papua New Guinea	44	102	78	85	65	4x	50	20x	930
Paraguay	100	107	97	97	105	50	69	66	160
Peru	72	108	87	96x	91x	64	51	56	280
Philippines	93	106	99	101	102x	40	47	53	280
Poland	147	113	99x	98	101	75x	-	99x	19
Portugal	164	110	95	97	117	66x	-	90x	15
Qatar	132	107	101	94	100	32x	-	97x	-
Romania	117	111	98	99	101	57	-	100x	130
Russian Federation	117	122	99	99	108	-	-	-	75
Rwanda	19	106	74	97	82	21	43	26	1300
Saint Kitts and Nevis	93	93	100x	-	-	41x	-	100x	-
Saint Lucia	127	93	-	-	-	47x	-	99x	-
Saint Vincent/Grenadines	123	92	-	-	-	58x	-	73x	-
Samoa	77	106	-	-	-	21	96	95x	35
San Marino	149	-	-	-	-	-	-	-	-
Sao Tome and Principe	57	92	58x	-	-	10x	49	86x	-
Saudi Arabia	108	106	69	95	82	-	60	82x	130
Senegal	36	104	53	75	52	13	34	46	1200
Seychelles	136	91	104x	-	-	-	100	99x	-
Sierra Leone	3	109	40	70	55	4x	65	25x	1800
Singapore	189	105	90	98x	103x	74x	-	100x	10
Slovakia	154	113	-	100	106	74	-	-	-
Slovenia	175	113	99x	100	102	-	-	-	13
Solomon Islands	113	107	-	87	67	25	63	87x	-
Somalia	10	105	39x	53x	56x	1x	28	2x	1600
South Africa	69	110	100	97	116	50x	26x	82	230
Spain	186	109	98	101	112	58x	-	96x	7
Sri Lanka	136	106	94	98	111	66	81	94	140
Sudan	42	106	60	79	79	8	44	69	660
Suriname	104	107	96	97x	116x	-	99x	91x	-
Swaziland	53	109	97	95	96	21x	65	55x	560
Sweden	189	107	-	100	101	78x	-	100x	7
Switzerland	186	109	-	102	96	71x	-	99x	6
Syria	100	108	65	90	82	36	78	67	180
Tajikistan	61	109	100	97	90	-	-	-	130
Tanzania	29	106	72	97	83	16	92	53	770
TFYR Macedonia	108	106	-	99	102	-	91x	-	-
Thailand	93	109	96	99	97	74	98	71x	200
Togo	38	106	55	66	35	12x	43	54x	640
Tonga	123	93	-	-	-	39	88	92	-

BEST COPY AVAILABLE

	Under-5 mortality rank	Life expectancy females as a % of males 1996	Adult literacy rate females as a % of males 1995	Enrolment ratios females as a % of males 1990-95		Contraceptive prevalence (%) 1990-97	% of pregnant women immunized against tetanus 1995-96	% of births attended by trained health personnel 1990-96	Maternal mortality rate 1990
				primary school	secondary school				
Trinidad and Tobago	**143**	107	98	100	105	53x	19x	98x	90
Tunisia	**97**	103	70	92	91	60	80	69x	170
Turkey	**82**	108	78	93	66	63	32	76	180
Turkmenistan	**58**	111	98x						55
Tuvalu	**74**						53		
Uganda	**30**	105	68	80	57	15	56	38	1200
Ukraine	**121**	116	101	100	108			100x	50
United Arab Emirates	**139**	103	101	96	110			96x	26
United Kingdom	**164**	108		100	102	82		100x	9
United States	**163**	110		99	99	74x		99x	12
Uruguay	**127**	109	101	99	119	84	13x	96x	85
Uzbekistan	**71**	111	100	97	88	56			55
Vanuatu	**77**	106	84x	102	78	15	15	86x	280
Venezuela	**115**	107	98	103	141	49x	60	69x	120
Viet Nam	**85**	108	94	94x	93x	65	82	95x	160
Yemen	**50**	102	49x	40	24	7	56	16	1400
Yugoslavia, Fed. Rep.	**127**	107	98	104	103				
Zambia	**13**	102	83	93	61	15	48	51	940
Zimbabwe	**65**	104	89	93	80	48	65	69	570

Regional summaries

Sub-Saharan Africa	106	71	82	80	15	38	37	980
Middle East and North Africa	104	67	86	82	46	57	67	320
South Asia	101	57	77	63	38	71	29	610
East Asia and Pacific	106	84	97	88	74	35	75	210
Latin America and Caribbean	109	97	97	109	64	58	78	190
CEE/CIS and Baltic States	113	97	98	98	64		90	85
Industrialized countries	109	98	100	101	72		99	13
Developing countries	104	78	88	81	54	51	53	470
Least developed countries	104	63	79	59	19	48	29	1100
World	105	87	90	86	57	51	57	430

Countries in each region are listed on page 122.

Definitions of the indicators

Life expectancy at birth – The number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.

Adult literacy rate – Percentage of persons aged 15 and over who can read and write.

Primary or secondary enrolment ratios – The number of children enrolled in a schooling level (primary or secondary), regardless of age, divided by the population of the age group which officially corresponds to that level.

Contraceptive prevalence – Percentage of married women aged 15-49 years currently using contraception.

Births attended – Percentage of births attended by physicians, nurses, midwives, or primary health care workers trained in midwifery skills.

Maternal mortality rate – Annual number of deaths of women from pregnancy related causes per 100,000 live births. Several of the maternal mortality rates in table 7 are substantially different from official government estimates. These and other rates are being reviewed by WHO and UNICEF and will be revised where necessary, as part of the ongoing process of improving maternal mortality estimates.

Main data sources

Life expectancy – United Nations Population Division.

Adult literacy – United Nations Educational, Scientific and Cultural Organization (UNESCO).

School enrolment – United Nations Educational, Scientific and Cultural Organization (UNESCO) and Demographic and Health Surveys.

Immunization – World Health Organization (WHO), UNICEF, Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS).

Contraceptive prevalence – United Nations Population Division and Demographic and Health Surveys.

Births attended – World Health Organization (WHO).

Maternal mortality – World Health Organization (WHO) and UNICEF.

Notes

– Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Regional summaries country list

Regional averages given at the end of each table are calculated using data from the countries as grouped below.

Sub-Saharan Africa

Angola; Benin; Botswana; Burkina Faso; Burundi; Cameroon; Cape Verde; Central African Rep.; Chad; Comoros; Congo; Congo, Dem. Rep.; Côte d'Ivoire; Equatorial Guinea; Eritrea; Ethiopia; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique; Namibia; Niger; Nigeria; Rwanda; Sao Tome and Principe; Senegal; Seychelles; Sierra Leone; Somalia; South Africa; Swaziland; Tanzania; Togo; Uganda; Zambia; Zimbabwe

Middle East and North Africa

Algeria; Bahrain; Cyprus; Djibouti; Egypt; Iran; Iraq; Jordan; Kuwait; Lebanon; Libya; Morocco; Oman; Qatar; Saudi Arabia; Sudan; Syria; Tunisia; United Arab Emirates; Yemen

South Asia

Afghanistan; Bangladesh; Bhutan; India; Maldives; Nepal; Pakistan; Sri Lanka

East Asia and Pacific

Brunei Darussalam; Cambodia; China; Cook Islands; Fiji; Indonesia; Kiribati; Korea, Dem. People's Rep.; Korea, Rep. of; Lao People's Dem. Rep.; Malaysia; Marshall Islands; Micronesia, Fed. States of; Mongolia; Myanmar; Nauru; Niue; Palau; Papua New Guinea; Philippines; Samoa; Singapore; Solomon Islands; Thailand; Tonga; Tuvalu; Vanuatu; Viet Nam

Latin America and Caribbean

Antigua and Barbuda; Argentina; Bahamas; Barbados; Belize; Bolivia; Brazil; Chile; Colombia; Costa Rica; Cuba; Dominica; Dominican Rep.; Ecuador; El Salvador; Grenada; Guatemala; Guyana; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; Paraguay; Peru; Saint Kitts and Nevis; Saint Lucia; Saint Vincent/Grenadines; Suriname; Trinidad and Tobago; Uruguay; Venezuela

CEE/CIS and Baltic States

Albania; Armenia; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Rep.; Estonia; Georgia; Hungary; Kazakstan; Kyrgyzstan; Latvia; Lithuania; Moldova, Rep. of; Poland; Romania; Russian Federation; Slovakia; Tajikistan; TFYR Macedonia; Turkey; Turkmenistan; Ukraine; Uzbekistan; Yugoslavia, Fed. Rep.

Industrialized countries

Andorra; Australia; Austria; Belgium; Canada; Denmark; Finland; France; Germany; Greece; Holy See; Iceland; Ireland; Israel; Italy; Japan; Liechtenstein; Luxembourg; Malta; Monaco; Netherlands; New Zealand; Norway; Portugal; San Marino; Slovenia; Spain; Sweden; Switzerland; United Kingdom; United States

Developing countries

Afghanistan; Algeria; Angola; Antigua and Barbuda; Argentina; Armenia; Azerbaijan; Bahamas; Bahrain; Bangladesh; Barbados; Belize; Benin; Bhutan; Bolivia; Botswana; Brazil; Brunei Darussalam; Burkina Faso; Burundi; Cambodia; Cameroon; Cape Verde; Central African Rep.; Chad; Chile; China; Colombia; Comoros; Congo; Congo, Dem. Rep.; Cook Islands; Costa Rica; Côte d'Ivoire; Cuba; Cyprus; Djibouti; Dominica; Dominican Rep.; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Ethiopia; Fiji; Gabon; Gambia; Georgia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; India; Indonesia; Iran; Iraq; Israel; Jamaica; Jordan; Kazakstan; Kenya; Kiribati; Korea, Dem. People's Rep.; Korea, Rep. of; Kuwait; Kyrgyzstan; Lao People's Dem. Rep.; Lebanon; Lesotho; Liberia; Libya; Madagascar; Malawi; Malaysia; Maldives; Mali; Marshall Islands; Mauritania; Mauritius; Mexico; Micronesia, Fed. States of; Mongolia; Morocco; Mozambique; Myanmar; Namibia; Nauru; Nepal; Nicaragua; Niger; Nigeria; Niue; Oman; Pakistan; Palau; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Qatar; Rwanda; Saint Kitts and Nevis; Saint Lucia; Saint Vincent/Grenadines; Samoa; Sao Tome and Principe; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; Solomon Islands; Somalia; South Africa; Sri Lanka; Sudan; Suriname; Swaziland; Syria; Tajikistan; Tanzania; Thailand; Togo; Tonga; Trinidad and Tobago; Tunisia; Turkey; Turkmenistan; Tuvalu; Uganda; United Arab Emirates; Uruguay; Uzbekistan; Vanuatu; Venezuela; Viet Nam; Yemen; Zambia; Zimbabwe

Least developed countries

Afghanistan; Angola; Bangladesh; Benin; Bhutan; Burkina Faso; Burundi; Cambodia; Cape Verde; Central African Rep.; Chad; Comoros; Congo, Dem. Rep.; Djibouti; Equatorial Guinea; Eritrea; Ethiopia; Gambia; Guinea; Guinea-Bissau; Haiti; Kiribati; Lao People's Dem. Rep.; Lesotho; Liberia; Madagascar; Malawi; Maldives; Mali; Mauritania; Mozambique; Myanmar; Nepal; Niger; Rwanda; Samoa; Sao Tome and Principe; Sierra Leone; Solomon Islands; Somalia; Sudan; Tanzania; Togo; Tuvalu; Uganda; Vanuatu; Yemen; Zambia

Measuring human development

An introduction to table 8

If development in the 1990s is to assume a more human face then there arises a corresponding need for a means of measuring human as well as economic progress. From UNICEF's point of view, in particular, there is a need for an agreed method of measuring the level of child well-being and its rate of change.

The under-five mortality rate (U5MR) is used in table 8 (next page) as the principal indicator of such progress.

The U5MR has several advantages. First, it measures an end result of the development process rather than an 'input' such as school enrolment level, per capita calorie availability, or the number of doctors per thousand population — all of which are means to an end.

Second, the U5MR is known to be the result of a wide variety of inputs: the nutritional health and the health knowledge of mothers; the level of immunization and ORT use; the availability of maternal and child health services (including prenatal care); income and food availability in the family; the availability of clean water and safe sanitation; and the overall safety of the child's environment.

Third, the U5MR is less susceptible than, say, per capita GNP to the fallacy of the average. This is because the natural scale does not allow the children of the rich to be one thousand times as likely to survive, even if the man-made scale does permit them to have one thousand times as much income. In other words, it is much more difficult for a wealthy minority to affect a nation's U5MR, and it therefore presents a more accurate, if far from perfect, picture of the health status of the majority of children (and of society as a whole).

For these reasons, the U5MR is chosen by UNICEF as its single most important indicator of the state of a nation's children. That is why the tables rank the nations of the world not in ascending order of their per capita GNP but in descending order of their under-five mortality rates.

The speed of progress in reducing the U5MR can be measured by calculating its average annual reduction rate (AARR). Unlike the comparison of absolute changes, the AARR reflects the fact that the lower limits to U5MR are approached only with increasing difficulty. As lower levels of under-five mortality are reached, for example, the same absolute reduction obviously represents a greater percentage of reduction. The AARR therefore shows a higher rate of progress for, say, a 10-point reduction if that reduction happens at a lower level of under-five mortality. (A fall in U5MR of 10 points from 100 to 90 represents a reduction of 10 per cent, whereas the same 10-point fall from 20 to 10 represents a reduction of 50 per cent).

When used in conjunction with GNP growth rates, the U5MR and its reduction rate can therefore give a picture of the progress being made by any country or region, and over any period of time, towards the satisfaction of some of the most essential of human needs.

As table 8 shows, there is no fixed relationship between the annual reduction rate of the U5MR and the annual rate of growth in per capita GNP. Such comparisons help to throw the emphasis on to the policies, priorities, and other factors which determine the ratio between economic and social progress.

Finally, the table gives the total fertility rate for each country and its average annual rate of reduction. It will be seen that many of the nations that have achieved significant reductions in their U5MR have also achieved significant reductions in fertility.

Table 8: The rate of progress

	Under-5 mortality rank	Under-5 mortality rate			Average annual rate of reduction (%)			GNP per capita average annual growth rate (%)		Total fertility rate			Average annual rate of reduction (%)	
		1960	1980	1996	1960-80	1980-96	required 1996-2000	1965-80	1985-95	1960	1980	1996	1960-80	1980-96
Afghanistan	4	360	280	257	1.3	0.5	32.5	0.6		6.9	7.1	6.9	-0.1	0.2
Albania	88	151	57	40	4.9	2.2	9.6		6.0x	5.9	3.8	2.7	2.2	2.1
Algeria	92	255	139	39	3.0	7.9	4.9	4.2	-2.4	7.3	6.8	4.0	0.4	3.3
Andorra	175			6										
Angola	2	345	261	292	1.4	-0.7	35.7		-6.1	6.4	6.9	6.8	-0.4	0.1
Antigua and Barbuda	127			22					-2.7					
Argentina	117	72	38	25	3.2	2.6	7.3	1.7	1.8	3.1	3.3	2.7	-0.3	1.3
Armenia	108	48	28	30	2.7	0.4	8.3		15.1	4.5	2.4	1.8	3.1	1.8
Australia	175	24	13	6	3.0	4.7	0.0	2.2	1.4	3.3	2.0	1.9	2.5	0.3
Austria	175	33	17	6	4.6	7.1	3.4	4.0	1.9	2.7	1.6	1.4	2.6	0.8
Azerbaijan	85	75	52	45	1.8	0.9	10.7		-16.3	5.5	3.3	2.4	2.6	2.0
Bahamas	123	68	35	23	3.3	2.6	4.4		0.8	3.8	2.8	2.0	1.5	2.1
Bahrain	127	203	42	22	7.9	4.0	9.1		0.2	7.1	4.9	3.1	1.9	2.9
Bangladesh	44	247	211	112	0.8	4.0	11.8	0.3	2.1	6.7	6.4	3.2	0.2	4.3
Barbados	152	90	29	12	5.7	5.5	9.2		0.8	4.5	2.1	1.7	3.8	1.3
Belarus	139	47	26	18	3.0	2.3	7.6		-5.2	2.7	2.1	1.5	1.3	2.1
Belgium	164	35	15	7	4.3	5.0	1.5	3.6	2.2	2.6	1.6	1.6	2.4	0.0
Belize	85	104	70	44	2.0	2.9	7.4		3.9	6.5	5.8	3.8	0.6	2.6
Benin	31	310	176	140	2.8	1.4	17.3	-0.3	-0.3	6.9	7.1	6.0	0.1	1.1
Bhutan	36	300	227	127	1.4	3.6	14.9		4.9	5.9	5.9	5.9	0.0	0.0
Bolivia	51	252	170	102	2.0	3.2	9.4	1.7	1.8	6.7	5.6	4.5	0.9	1.4
Bosnia and Herzegovina	143	155	38	17	7.0	5.0	6.1			4.0	2.1	1.4	3.2	2.5
Botswana	80	170	94	50	3.0	3.9	4.8	9.9	6.1	6.8	6.1	4.6	0.5	1.8
Brazil	79	177	92	52	3.3	3.6	6.6	6.3	0.8	6.2	4.0	2.3	2.2	3.5
Brunei Darussalam	154	87	22	11	6.9	4.3	10.9			6.9	4.1	2.8	2.6	2.4
Bulgaria	136	70	25	19	5.1	1.7	11.5		2.6	2.2	2.1	1.5	0.2	2.1
Burkina Faso	23	318	246	158	1.3	2.8	20.4	1.7	-0.2	6.7	7.8	6.7	-0.8	1.0
Burundi	17	255	193	176	1.4	0.6	23.0	2.4	1.3	6.8	6.8	6.4	0.0	0.4
Cambodia	19	217	330	170	2.1	4.1	22.2		2.0	6.3	4.6	4.6	1.6	0.0
Cameroon	51	264	173	102	2.1	3.3	9.4	2.4	6.6	5.8	6.4	5.4	0.5	1.1
Canada	164	33	13	7	4.8	4.0	4.0	3.3	0.4	3.8	1.7	1.6	4.0	0.4
Cape Verde	65	164	95	73	2.7	1.7	10.1		2.1	7.0	6.5	3.7	0.4	3.5
Central African Rep	21	343	180	164	3.2	0.6	21.3	0.8	2.4	5.6	5.8	5.1	0.2	0.8
Chad	27	325	209	149	2.3	2.0	18.9	1.9	0.6	6.0	5.9	5.6	0.1	0.3
Chile	149	138	35	13	6.9	6.2	0.9	0.0	6.1	5.3	2.8	2.5	3.2	0.7
China	82	209	65	47	5.9	2.0	10.2	4.1	8.3	5.7	2.9	1.8	3.4	3.0
Colombia	104	130	58	31	4.0	3.9	3.7	3.7	2.6	6.8	3.8	2.8	2.9	1.9
Comoros	39	248	167	122	2.0	2.0	13.9		-1.4	6.8	7.1	5.7	-0.2	1.4
Congo	48	220	125	108	2.8	0.9	10.8	2.7	-3.2	5.9	6.3	6.0	-0.3	0.3
Congo, Dem. Rep	12	302	210	207	1.8	0.1	27.1	1.3	-8.5	6.0	6.6	6.4	-0.5	0.2
Cook Islands	108		37	30		1.3	8.6							
Costa Rica	146	112	29	15	6.8	4.0	8.7	3.3	2.8	7.0	3.7	3.0	3.2	1.3
Côte d'Ivoire	25	300	170	150	2.8	0.8	19.1	2.8	-4.3	7.2	7.4	5.3	-0.1	2.1
Croatia	154	98	23	11	7.2	4.6	5.9			2.3	2.0	1.6	0.7	1.4
Cuba	150	54	22	10	4.5	4.7	4.5			4.2	2.0	1.6	3.7	1.4
Cyprus	159	36	20	10	2.9	4.7	4.6		4.6	3.5	2.4	2.3	1.9	0.3
Czech Rep	164	25	19	7	1.4	6.6	-2.9		1.8	2.3	2.2	1.5	0.2	2.4
Denmark	175	25	10	6	4.4	3.1	1.2	2.2	1.5	2.6	1.6	1.8	2.4	0.7
Djibouti	24	289	199	157	1.9	1.5	20.2		-1.5	7.0	6.6	5.5	0.3	1.1
Dominica	133			20			6.7		4.1					
Dominican Rep	74	149	92	56	2.4	3.1	6.4	3.8	2.1	7.4	4.3	2.9	2.7	2.5
Ecuador	88	180	101	40	2.9	5.8	4.6	5.4	0.8	6.7	5.1	3.2	1.4	2.9
Egypt	58	282	175	78	2.4	5.1	7.7	2.8	1.1	7.0	5.2	3.5	1.5	2.5
El Salvador	88	210	120	40	2.8	6.9	2.6	1.5	2.8	6.8	5.1	3.2	1.4	2.9
Equatorial Guinea	18	316	243	173	1.3	2.1	22.6		2.3	5.5	5.7	5.6	0.2	0.1
Eritrea	41	250	195	120	1.2	3.0	13.5			6.6	6.1	5.5	0.4	0.6
Estonia	145	52	25	16	3.7	2.8	3.3		4.3	2.0	2.1	1.4	-0.2	2.5
Ethiopia	16	280	213	177	1.4	1.2	23.2	0.4	0.3	6.9	6.9	7.0	0.0	-0.1

BEST COPY AVAILABLE

	Under-5 mortality rank	Under-5 mortality rate			Average annual rate of reduction (%)			GNP per capita average annual growth rate (%)		Total fertility rate			Average annual rate of reduction (%)	
		1960	1980	1996	1960-80	1980-96	required 1996-2000	1965-80	1985-95	1960	1980	1996	1960-80	1980-96
Fiji	**121**	97	42	24	4.2	3.5	3.6	.	2.0	6.4	3.9	2.8	2.5	2.1
Finland	**189**	28	9	4	5.9	4.4	1.1	3.6	-0.2	2.7	1.7	1.8	2.3	0.4
France	**175**	34	13	6	4.9	5.2	-2.6	3.7	1.5	2.8	1.9	1.7	1.9	0.7
Gabon	**28**	287	194	145	2.0	1.8	18.2	5.6	-8.2	4.1	4.4	5.3	-0.4	1.2
Gambia	**49**	375	250	107	2.0	5.3	10.6	.	0.3	6.4	6.5	5.3	-0.1	1.3
Georgia	**113**	70	44	29	2.3	2.6	8.4		-17.0	2.9	2.3	2.0	1.2	0.9
Germany	**175**	40	16	6	4.7	6.2	-0.4	3.0x	1.9x	2.4	1.5	1.3	2.4	0.9
Ghana	**47**	213	155	110	1.6	2.1	11.3	0.8	1.4	6.9	6.5	5.4	0.3	1.2
Greece	**161**	64	23	9	5.2	5.9	4.6	4.8	1.3	2.2	2.1	1.4	0.2	2.5
Grenada	**104**			31			5.7							
Guatemala	**74**	204	140	56	1.9	5.7	1.2	3.0	0.3	6.9	6.3	5.0	0.5	1.4
Guinea	**11**	380	300	210	1.2	2.2	27.5	1.3	1.4	7.0	7.0	6.7	0.0	0.3
Guinea-Bissau	**6**	336	290	223	0.7	1.7	29.0	-2.7	2.0	5.1	5.7	5.5	-0.6	0.2
Guyana	**56**	126	90	83	1.7	0.5	8.1		0.6	6.5	3.6	2.4	3.0	2.5
Haiti	**34**	260	200	134	1.3	2.5	16.2	0.9	5.2	6.3	5.3	4.7	0.9	0.8
Holy See	.													
Honduras	**97**	204	101	35	3.5	6.6	0.7	1.1	0.1	7.5	6.3	4.5	0.9	2.1
Hungary	**152**	57	26	12	3.9	4.8	2.4	5.1	1.0	2.0	2.0	1.5	0.0	1.8
Iceland	**186**	22	9	5	4.5	3.3	12.6	.	1.0	4.0	2.3	2.2	2.8	0.3
India	**46**	236	177	111	1.4	2.9	11.5	1.5	3.2	5.9	4.7	3.2	1.1	2.4
Indonesia	**67**	216	128	71	2.6	3.7	2.9	5.2	6.0	5.5	4.4	2.7	1.1	3.1
Iran	**96**	233	126	37	3.1	7.7	-1.5	2.9	1.5	7.2	6.7	4.9	0.4	2.0
Iraq	**39**	171	83	122	3.6	-2.4	33.5			7.2	6.5	5.4	0.5	1.2
Ireland	**164**	36	14	7	4.6	4.4	4.2	2.8	5.2	3.8	3.2	1.9	0.9	3.3
Israel	**161**	39	19	9	3.6	5.0	2.8	3.7	7.5	3.9	3.3	2.8	0.8	1.0
Italy	**164**	50	17	7	5.3	5.7	1.5	3.2	1.8	2.5	1.7	1.2	1.9	2.2
Jamaica	**154**	76	39	11	3.4	7.8	0.9	0.1	3.6	5.4	3.8	2.5	1.8	2.6
Japan	**175**	40	11	6	6.6	3.5	9.5	5.1	2.9	2.0	1.8	1.5	0.5	1.1
Jordan	**117**	139	64	25	3.9	5.9	1.0	5.8x	4.5	7.7	7.1	5.3	0.4	1.8
Kazakstan	**84**	74	57	45	1.3	1.5	8.5		8.6	4.5	3.0	2.4	2.0	1.4
Kenya	**55**	202	112	80	2.9	1.4	10.1	3.1	0.1	8.0	7.8	5.0	0.1	2.8
Kiribati	**61**			76			6.5		0.6					
Korea, Dem. People's Rep.	**108**	120	43	30	5.1	2.3	6.3			5.8	2.8	2.1	3.6	1.8
Korea, Rep. of	**164**	127	19	7	9.8	5.8	3.9	7.3	7.7	6.0	2.7	1.7	4.0	2.9
Kuwait	**147**	128	35	14	6.6	5.6	6.4	0.6x	1.1	7.3	5.4	2.9	1.5	3.9
Kyrgyzstan	**80**	115	73	50	2.3	2.4	7.7		6.9	5.1	4.1	3.3	1.1	1.4
Lao People's Dem. Rep.	**35**	235	200	128	0.8	2.8	15.1		2.7	6.2	6.7	6.7	-0.4	0.0
Latvia	**133**	44	26	20	2.6	1.6	10.2		6.6	1.9	2.0	1.5	-0.3	1.8
Lebanon	**88**	85	40	40	3.8	0.0	10.1		2.7	6.3	4.0	2.9	2.3	2.0
Lesotho	**32**	203	168	139	0.9	1.2	17.1	6.8	1.2	5.8	5.7	5.0	0.1	0.8
Liberia	**5**	288	235	235	1.0	0.0	30.3	0.5		6.6	6.8	6.5	-0.1	0.3
Libya	**70**	269	118	61	4.1	4.1	4.0	0.0		7.1	7.3	6.1	-0.1	1.1
Liechtenstein	**164**			7										
Lithuania	**139**	70	25	18	5.1	2.1	7.6		11.7	2.5	2.1	1.6	0.9	1.7
Luxembourg	**164**	41	16	7	4.6	4.8	6.5		0.9	2.3	1.5	1.7	2.1	-0.8
Madagascar	**21**	364	216	164	2.6	1.7	21.3	0.4	-2.2	6.6	6.5	5.8	0.0	0.8
Malawi	**8**	365	290	217	1.1	1.8	28.3	3.2	0.7	6.9	7.6	6.8	-0.5	0.7
Malaysia	**149**	105	42	13	4.6	7.3	1.3	4.7	5.1	6.8	4.2	3.4	2.4	1.3
Maldives	**61**	258	129	76	3.5	3.3	7.6		5.9	7.0	6.9	6.8	0.1	0.1
Mali	**7**	500	300	220	2.6	1.9	28.6	2.1x	0.8	7.1	7.1	6.8	0.0	0.3
Malta	**154**	42	17	11	4.6	2.8	4.3		5.1	3.4	2.0	2.1	2.7	0.3
Marshall Islands	**54**			92			10.2							
Mauritania	**15**	330	175	183	3.2	0.3	24.0	0.1	0.5	6.5	6.3	5.1	0.2	1.3
Mauritius	**123**	84	42	23	3.4	3.9	6.9	3.7	5.4	5.8	2.8	2.3	3.6	1.2
Mexico	**102**	148	87	32	2.7	6.3	5.3	3.6	0.1	6.9	4.8	2.9	1.8	3.1
Micronesia, Fed. States of	**116**			27			6.6							
Moldova, Rep. of	**102**	88	52	32	2.6	3.0	6.5		-8.2	3.3	2.5	1.9	1.4	1.7
Monaco	**175**			6										

Table 8: The rate of progress

	Under-5 mortality rank	Under-5 mortality rate			Average annual rate of reduction (%)			GNP per capita average annual growth rate (%)		Total fertility rate			Average annual rate of reduction (%)	
		1960	1980	1996	1960-80	1980-96	required 1996-2000	1965-80	1985-95	1960	1980	1996	1960-80	1980-96
Mongolia	67	185	112	71	2.5	2.8	5.8	.	-3.8	6.0	6.2	3.4	0.2	3.8
Morocco	64	220	152	74	1.8	4.5	7.3	2.7	0.9	7.2	5.5	3.3	1.3	3.2
Mozambique	9	280	280	214	0.0	1.7	27.9	.	3.6	6.3	6.5	6.2	0.2	0.3
Myanmar	25	237	146	150	2.4	-0.2	19.1	1.6	0.4	6.0	5.1	3.4	0.8	2.5
Namibia	60	206	114	77	3.0	2.5	8.1	.	2.9	6.0	5.9	5.0	0.1	1.0
Nauru	104	.	.	31	.	.	.	.	.	.	.	.	.	.
Nepal	42	315	195	116	2.4	3.2	12.6	.	2.4	5.8	6.2	5.1	0.3	1.2
Netherlands	175	22	11	6	3.4	3.8	3.2	2.7	1.9	3.1	1.5	1.6	3.6	0.4
New Zealand	164	26	16	7	2.5	4.7	0.3	1.7	0.8	3.9	2.1	2.1	3.1	0.0
Nicaragua	73	209	143	57	1.9	5.7	3.3	0.7	5.4	7.3	6.2	4.0	0.8	2.7
Niger	1	320	320	320	0.0	0.0	38.0	2.5	2.1	7.3	8.1	7.2	0.5	0.7
Nigeria	14	204	196	191	0.2	0.1	25.1	4.2	1.2	6.5	6.5	6.1	0.0	0.4
Niue	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Norway	175	23	11	6	3.8	4.1	0.9	3.6	1.7	2.9	1.8	1.9	2.4	0.3
Oman	139	280	95	18	5.4	10.4	2.6	9.0	0.3	7.2	7.2	7.2	0.0	0.0
Pakistan	33	226	161	136	1.7	1.1	16.6	1.8	1.2	6.9	6.8	5.2	0.1	1.7
Palau	97	.	39	35	.	0.7	10.2	.	.	.	.	.	.	.
Panama	133	104	31	20	6.0	2.7	9.1	2.8	0.4	5.9	3.8	2.7	2.2	2.1
Papua New Guinea	44	204	112	112	3.0	0.0	11.8	.	2.3	6.3	5.6	4.8	0.6	1.0
Paraguay	100	90	61	34	1.9	3.7	8.0	4.1	1.2	6.5	5.2	4.3	1.1	1.2
Peru	72	234	126	58	3.1	4.8	3.7	0.8	-1.6	6.9	5.0	3.1	1.6	3.0
Philippines	93	107	69	38	2.2	3.7	2.3	3.2	1.5	6.9	4.9	3.7	1.7	1.8
Poland	147	70	24	14	5.3	3.6	3.3	.	1.2	3.0	2.3	1.7	1.3	1.9
Portugal	164	112	31	7	6.4	9.1	9.9	4.6	3.6	3.1	2.2	1.5	1.7	2.4
Qatar	132	239	55	21	7.3	6.0	3.4	.	4.2	7.0	5.8	3.9	0.9	2.5
Romania	117	82	36	25	4.1	2.2	4.2	.	3.8	2.3	2.4	1.4	-0.2	3.4
Russian Federation	117	65	36	25	3.0	2.3	5.6	.	5.1	2.6	2.0	1.4	1.3	2.2
Rwanda	19	210	218	170	-0.2	1.6	22.2	1.6	5.4	7.5	8.3	6.2	-0.5	1.8
Saint Kitts and Nevis	93	.	.	38	.	.	6.5	.	4.8	.	.	.	.	.
Saint Lucia	127	.	.	22	.	.	10.1	.	3.9	.	.	.	.	.
Saint Vincent/Grenadines	123	.	.	23	.	.	7.1	.	3.8	.	.	.	.	.
Samoa	77	210	100	53	3.7	4.0	6.2	.	0.2	8.3	5.9	3.9	1.7	2.6
San Marino	149	.	.	13	.	.	.	.	.	.	.	.	.	.
Sao Tome and Principe	57	.	.	80	.	.	7.2	.	2.1	.	.	.	.	.
Saudi Arabia	108	292	85	30	6.2	6.5	0.0	4.0x	-1.9	7.2	7.3	6.0	0.1	1.2
Senegal	36	300	218	127	1.6	3.4	14.9	0.5	1.2	7.0	6.9	5.8	0.1	1.1
Seychelles	136	.	.	19	.	.	7.6	.	4.2	.	.	.	.	.
Sierra Leone	3	385	301	284	1.2	0.4	35.0	0.7	3.6	6.2	6.5	6.2	-0.2	0.3
Singapore	189	40	13	4	5.6	7.1	-5.8	8.3	6.2	5.5	1.8	1.8	5.6	0.0
Slovakia	154	40	23	11	2.7	4.7	1.9	.	2.8	3.1	2.4	1.6	1.3	2.5
Slovenia	175	45	18	6	4.6	6.8	2.3	.	.	2.4	2.1	1.3	0.7	3.0
Solomon Islands	113	185	56	29	6.0	4.1	4.7	.	3.2	6.4	6.7	5.1	0.2	1.7
Somalia	10	294	246	211	0.9	1.0	27.6	-0.1	2.3x	7.0	7.0	7.0	0.0	0.0
South Africa	69	126	91	66	1.6	2.0	7.6	3.2	1.1	6.5	4.9	3.9	1.4	1.4
Spain	186	57	16	5	6.2	7.1	2.3	4.1	2.6	2.8	2.2	1.2	1.2	3.8
Sri Lanka	136	130	52	19	4.6	6.3	9.3	2.8	2.6	5.3	3.5	2.1	2.1	3.2
Sudan	42	210	145	116	1.9	1.4	12.6	0.8	0.6	6.7	6.5	4.7	0.2	2.0
Suriname	104	96	52	31	3.0	3.3	4.8	.	3.5	6.6	3.8	2.5	2.8	2.6
Swaziland	53	233	151	97	2.2	2.7	8.2	.	1.4	6.5	6.3	4.6	0.2	2.0
Sweden	189	20	9	4	4.1	5.1	-1.3	2.0	0.1	2.3	1.6	1.9	1.8	-1.1
Switzerland	186	27	11	5	4.5	4.5	0.5	1.5	0.2	2.4	1.5	1.5	2.4	0.0
Syria	100	201	73	34	5.1	4.8	3.5	5.1	0.9	7.3	7.4	4.2	0.1	3.5
Tajikistan	61	140	94	76	2.0	1.3	9.5	.	-13.0	6.3	5.7	4.0	0.5	2.2
Tanzania	29	240	176	144	1.6	1.3	18.0	0.8	1.0	6.8	6.8	5.6	0.0	1.2
TFYR Macedonia	108	177	69	30	4.7	5.2	2.4	.	.	4.2	2.6	2.0	2.4	1.6
Thailand	93	148	58	38	4.7	2.6	8.3	4.4	8.4	6.4	3.6	1.8	2.9	4.3
Togo	38	267	175	125	2.1	2.1	14.5	1.7	2.7	6.6	6.6	6.2	0.0	0.4
Tonga	123	.	.	23	.	.	6.1	.	0.5	.	.	.	.	.

BEST COPY AVAILABLE

	Under-5 mortality rank	Under-5 mortality rate			Average annual rate of reduction (%)			GNP per capita average annual growth rate (%)		Total fertility rate			Average annual rate of reduction (%)	
		1960	1980	1996	1960-80	1980-96	required 1996-2000	1965-80	1985-95	1960	1980	1996	1960-80	1980-96
Trinidad and Tobago	**143**	73	40	17	3.0	5.3	1.4	3.1	-1.7	5.1	3.3	2.2	2.2	2.5
Tunisia	**97**	254	100	35	4.7	6.6	0.2	4.7	1.9	7.1	5.3	3.0	1.5	3.6
Turkey	**82**	219	133	47	2.5	6.5	0.2	3.6	2.2	6.3	4.3	2.6	1.9	3.1
Turkmenistan	**58**	150	95	78	2.3	1.2	9.5	.	-9.6	6.4	5.1	3.7	1.1	2.0
Tuvalu	**74**	.	77	56	.	2.0	10.2	.	.	.	.	.	.	.
Uganda	**30**	224	180	141	1.1	1.5	17.5	2.2	2.7	6.9	7.0	7.1	0.1	-0.1
Ukraine	**121**	53	28	24	3.2	1.0	10.1	.	-9.2	2.2	2.0	1.5	0.5	1.8
United Arab Emirates	**139**	240	64	18	6.6	7.9	2.9	.	-2.8	6.9	5.4	3.6	1.2	2.5
United Kingdom	**164**	27	14	7	3.1	4.6	4.0	2.0	1.4	2.7	1.8	1.7	2.0	0.4
United States	**163**	30	15	8	3.3	3.8	5.4	1.8	1.3	3.5	1.8	2.0	3.3	-0.7
Uruguay	**127**	56	43	22	1.3	4.1	8.4	2.5	3.1	2.9	2.7	2.3	0.4	1.0
Uzbekistan	**71**	122	78	60	2.2	1.6	8.9	.	-3.9	6.3	4.9	3.6	1.3	1.9
Vanuatu	**77**	225	110	53	3.6	4.6	3.2	.	-1.1	7.2	5.4	4.5	1.4	1.1
Venezuela	**115**	70	47	28	2.6	2.6	12.2	2.3	0.5	6.6	4.2	3.1	2.3	1.9
Viet Nam	**85**	219	105	44	3.7	5.4	4.7	.	4.2	6.1	5.1	3.1	0.9	3.1
Yemen	**50**	340	198	105	2.7	4.0	10.1	.	.	7.6	7.6	7.6	0.0	0.0
Yugoslavia, Fed. Rep.	**127**	120	44	22	5.0	4.3	2.4	.	.	2.7	2.3	1.8	0.8	1.5
Zambia	**13**	213	149	202	1.8	-1.9	26.5	1.2	-0.8	6.6	7.1	5.6	-0.4	1.5
Zimbabwe	**65**	181	125	73	1.8	3.4	7.9	1.7	-0.6	7.5	6.4	4.8	0.8	1.8
Regional summaries														
Sub-Saharan Africa		257	197	171	1.3	0.9	23.0	2.8	0.9	6.6	6.6	5.9	0.0	0.7
Middle East and North Africa		241	134	65	2.9	4.6	7.6	3.1	0.9	7.1	6.2	4.5	0.7	2.0
South Asia		239	181	119	1.4	2.6	13.4	1.4	2.8	6.1	5.1	3.5	0.9	2.4
East Asia and Pacific		201	80	54	4.6	2.5	8.8	4.9	7.4	5.8	3.3	2.1	2.8	2.8
Latin America and Caribbean		157	87	43	3.0	4.4	6.2	4.0	0.5	6.0	4.2	2.8	1.8	2.6
CEE/CIS and Baltic States		101	56	36	2.9	2.8	5.2	.	-3.3	3.0	2.5	1.9	0.9	1.9
Industrialized countries		37	14	7	4.7	4.6	3.5	2.9	1.8	2.8	1.8	1.7	2.2	0.4
Developing countries		216	136	97	2.3	2.1	14.5	3.7	2.9	6.0	4.4	3.2	1.6	2.0
Least developed countries		280	214	171	1.4	1.4	22.3	-0.1	0.0	6.6	6.5	5.3	0.0	1.3
World		192	121	88	2.3	2.0	14.2	3.1	1.9	5.0	3.8	2.9	1.4	1.7

Countries in each region are listed on page 122.

Definitions of the indicators

Under-five mortality rate — Probability of dying between birth and exactly five years of age, expressed per 1,000 live births.

GNP per capita— Gross national product (GNP) is the sum of gross value added by all resident producers, plus any taxes that are not included in the valuation of output, plus net receipts of primary income from non-resident sources. GNP per capita is the gross national product, converted to United States dollars using the World Bank Atlas method, divided by the mid-year population.

Total fertility rate — The number of children that would be born per woman if she were to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates.

Average annual rate of reduction required 1996-2000 — The average annual reduction rate required, for the period 1996-2000, to achieve an under-five mortality rate in the year 2000 of 70 per 1,000 live births or two thirds the 1990 rate, whichever is less.

Main data sources

Under-five mortality — UNICEF, United Nations Population Division and United Nations Statistics Division.

GNP per capita — World Bank.

Fertility — United Nations Population Division.

Notes

. Data not available.

x Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country.

BEST COPY AVAILABLE

Index

A
Adair, Linda S., 16
adolescent pregnancy, 31
advertising of infant formula, 47–48
Africa, 10, 15
  Bamako Initiative in, 25–27, 65–66
  children with HIV in, 19, 73
  early marriage by girls in, 31
  economic resources in, 35
  sanitation and stunting in, 26
  underweight women in, 17
agriculture, 82–83
AIDS (acquired immune deficiency syndrome), 17, 31, 71, 73
  see also HIV
anaemia, 10, 11, 15, 61–63, 72, 78
  maternal deaths from, 75
  programme to control, 66
  tests for, 82
  vitamin A supplements and, 12
Arns, Zilda, 42
Asia, 18

B
Baby-Friendly Hospital Initiative (BFHI), 48–51, 67, 77
Bamako Initiative (Africa), 25–27, 65–66
Bangladesh, 13, 29, 52–53, 56, 59, 60, 72
Barker, David, 77
Begum, Marium, 52
beta-carotene, 12
birthweight, 78
  see also low-birthweight babies
Black, Robert, 72
Bolivia, 64, 65
Bosnia and Herzegovina, 80
brain, development of, 21–23, 53
Brazil, 17, 42–43, 49, 64
breastfeeding, 28–29, 77
  Baby-Friendly Hospital Initiative (BFHI) and, 48–51
  complementary feeding and, 49–51
  during crises, 80
  HIV and, 30, 73
  IQ scores and, 13
  nutrition and, 22–23
  stimulation in, 29
  vitamin A and, 60, 72

C
calcium, 14, 76
Canada, 54–57, 68
Caribbean, 18
caring practices, 27–31
carotene, 61
Cebu (Philippines), 16
Ceesay, Sana, 32
Central Asian republics, 17
Central Europe, 17
child mortality
  breastfeeding and, 22
  Convention on the Rights of the Child on, 21
  from malaria, 74
  in Oman, 40
  linked to malnutrition, 9, 11
  vitamin A supplements to reduce, 72
Child Pastorate (Brazil), 42–43
Child Survival and Development (CSD) Programme (Tanzania), 41–43, 51, 67
Chile, 50, 65
China, 50–51
chronic diseases, 10, 13, 77–78
cognitive development, 11, 16, 29
community involvement, 41–45, 69, 85
  in Bangladesh, 52–53
  in Niger programme, 46–47
  in Oman, Triple A approach, 40
  in South African health services, 86
  through schools and education, 66
Consultative Group on International Agricultural Research, 83
Convention on the Elimination of All Forms of Discrimination against Women (1979), 21
Convention on the Rights of the Child (1989), 20, 21, 69
cretinism, 15, 54, 56
Cuba, 50

D
dark adaptometry, 81
David, Jorge, 65
deaths
  chronic disease as cause of, 77
  from malaria, 74
  from malnutrition, 9, 78–79
  of mothers, 11, 12, 71–76
  see also child mortality
Declaration of the Rights of the Child (1924; 1959), 19–21
Declaration on the Right to Development (1986), 20
development (physical), 11, 21–22, 26
diabetes, 77, 78
diarrhoea, 22, 28, 42, 58, 65, 72
diarrhoeal dehydration, 11
diet
  boosting vitamin A in, 60–61
  enrichment of, 82–83
  see also nutrition
discrimination against women, 11, 29, 39
disease, 10, 77–78

E
Eastern Europe, 17
eclampsia, 75
economic growth, nutrition and, 17, 19, 37–39
economic resources, 34–35
Ecuador, 73
education, 15, 66
eggs, 61
Egypt, 72

F
F-100 milk, 79
Fall, Caroline, 78
families, impact of malnutrition on, 13
feeding of children, 28
flour, iron supplementation in, 61–65
foetal development, 21–22
folate deficiency, 10, 76, 83
foods
  during crises, 80
  enrichment of, 64–65, 82–83
  household food security and, 23–25, 37–39
  iron supplementation in, 61–63
  production, 68
  vitamin A in, 60–63
fortification of foods, 59–65, 82

G
Gabon, 49
Gambia, 31, 32
gardening, 59–61
Georgia (republic of), 15
girls, early marriage by, 31
government policies, 69, 87
growth (physical)
  iodine needed for, 53
  monitoring of, 41, 45–47
  stunting and, 15, 16, 26
  Triple A approach to, in Oman, 40
  see also development
growth failure, 14, 34
Guatemala, 15, 60, 64, 75
Guinea, 66

H
Haiti, 60, 80
Health and Nutrition District Support (HANDS) project (Tanzania), 44–45
health of children, protection of, 28–29
health services, 25–27, 63–66
  during crises, 80–81
  in South Africa, 86–87
heart disease, 77
Heavily Indebted Poor Countries (HIPC) Debt Initiative, 35

BEST COPY AVAILABLE

height, 14–16
see also stunting
Helen Keller International, 60–62
helminth (worm) infections, 84
HIV (human immunodeficiency virus), 19, 23, 30, 31, 71, 73–75
hookworms, 63, 75, 84
hospitals, Baby-Friendly Hospital Initiative (BFHI) and, 48–51, 77
household food security, 23–25, 37–39
hygiene, 27, 65

I

immune system
AIDS and, 31, 71, 73, 75
malaria and, 74
nutritionally acquired immune deficiency and, 71–73
zinc and, 72, 77
immunizations, 28, 59, 63
India, 59, 78, 85
Indonesia, 31, 37, 57, 61–64
infant formula, 47–48, 80
infant mortality, *see* child mortality
infants
Baby-Friendly Hospital Initiative (BFHI) and, 48–51
breastfeeding of, 22–23, 47–48, 77
HIV transferred to, 30
infections, 19, 71
intellectual development, 16–19
see also cognitive development
International Code of Marketing of Breastmilk Substitutes (1981), 48
International Council for Control of Iodine Deficiency Disorders (ICCIDD), 54
International Covenant on Economic, Social and Cultural Rights (1966), 20
international human rights instruments, 20
International Monetary Fund (IMF), 35
intestinal worms, 83–85
iodine, 14, 64, 79
iodine deficiency disorders (IDD), 10, 14, 15, 51–58, 79
eliminated in Bolivia, 65
in pregnant women, 76
iodized salt for, 17
testing for, 81–82
IQ scores, 11–13, 15, 22–23
Iran, 51
Iringa (Tanzania), 45
iron, 78
iron deficiency anaemia, 11, 14, 15, 61–63, 66, 72, 78
iron supplements, 61

J

Jebb, Eglantyne, 20

K

Kazakstan, 17
Kenya, 73, 84
Kiwanis International, 54, 56–57
kwashiorkor, 14

L

Lao People's Democratic Republic, 66
Latin America, 18
legislation, on food fortification, 64
low-birthweight babies, 22, 42
adult chronic diseases and, 77–78
IQ scores of, 11
nutritional intervention and, 32–33

M

malaria, 10, 63, 66, 72, 74–75, 83
Malawi, 73
Malaysia, 61
malnutrition, 9–17, 23–35, 83–87
Child Pastorate programme on, 42–43
Health and Nutrition District Support (Hands) project (Tanzania) on, 44–45
in Bangladesh, 52–53
in Thailand, 45
intellectual development linked to, 16
measurement of, 14, 79–82
Niger programme on, 46–47
nutritionally acquired immune deficiency and, 71–73
reducing deaths in emergency, 78–79
research in, 68
reversal of effects of, 17–19
marasmus (severe wasting), 14
Martorell, Reynaldo, 26
maternal height, 75
maternal mortality, 11–13, 75–76
measles, 63
vitamin A and, 58, 72
Mebendazole (drug), 84
mental impairments, 53, 54, 56
Micronutrient Initiative, 54, 61, 62
micronutrients, 10, 14
immune system and, 71–73
in foods, 64–65, 82–83
maternal deaths and, 76
Middle East, 18
milk, 79
minerals, 14
miscarriages, 54
Moldova, Republic of, 49
mothers, 29–31
breastfeeding and health of, 77
HIV transferred to children from, 73
vitamin A supplementation for, 60

N

Nepal, 12–13
newborns
breastfeeding of, 47–51
head circumference, 31
low-birthweight babies, 22, 32–33, 78
see also breastfeeding
Niger, 31, 45–47, 61, 66
night-blindness, 12, 58–59
nutrition, 17–19, 20
action for improvement in, 83–87
adult chronic disease and maternal, 78
AIDS and, 73
as right, 19–21, 68–69
boosting vitamin A in diet, 60–61
breastfeeding and, 22–23, 47–48
child development and, 21–22
combined approach to, 67–68
during crises, 80–81
economic growth and improved, 37–39
enrichment of foods for, 64–65, 82–83
for pregnant women, 21, 29, 32–33
immune system and, 71–73
iodine deficiency disorders and, 51–58
maternal deaths reduced by, 75–76
social-sector spending and, 39
status of women and, 39
Tanzanian programmes on, 41–45
Triple A approach to, in Oman, 40
nutritionally acquired immune deficiency, 71–73

O

obstructed labour, 15, 75
Oman, 40, 64
oral rehydration salts (ORS), 79
oral rehydration therapy (ORT), 65

P

Pakistan, 39
Panama, 49
Papua New Guinea, 74
parasite-induced anaemia, 66
Peru, 72, 75
Philippines, 16, 60, 64
poverty, 10, 34–35
as cause of malnutrition, 33–35
chronic diseases and, 77
household food security and, 25
in Latin America and Caribbean, 19
in South Africa, 86
in United States, 15–17

pregnant women
in Bangladesh, malnutrition among, 52
care received by, 31
consequences of iodine deficiency disorders in, 54
deaths of, 75–76
foetal development and weight gain by, 22
impact of malnutrition on, 11
iron deficiency anaemia in, 61, 78
malaria among, 10
nutrition for, 21, 29, 32–33
vitamin A supplements for, 12–13
with HIV, 73
prenatal care, 12–13
preventive health care, 27
protein-energy malnutrition (PEM), 14
in Bangladesh, 52

R

Rio de Janeiro (Brazil), 42
roundworms, 84
rural areas, 25
Russian Federation, 17

S

salt, iodized, 17, 53, 54, 55, 56, 57, 64, 67, 79, 82
sanitation, 26, 27, 65
schistosomes, 84
Senegal, 31
Shankar, Anuraj, 74
social services, 39
Solomons, Noel, 26
South Africa, 64, 86–87
South Asia, 10, 17, 26, 35, 39
South-East Asia, 17
Sri Lanka, 39
stunting, 15, 16, 26, 75
sanitation and, 26
sub-Saharan Africa, *see* Africa
sugar, 60
Sullivan, Kathleen, 57

T

Tanzania, 41–45, 51, 66, 67
Thailand, 39, 45–47
Triple A approach, 40, 41, 53, 67, 80
20-20 Initiative, 39

U

UNICEF
Baby-Friendly Hospital Initiative (BFHI) and, 50
Child Pastorate (Brazil) and, 43
iron supplements supplied by, 61
on food fortified with vitamin A, 64
on malaria control, 66
salt iodization and, 54
20-20 Initiative of, 39
vitamin A supplementation by, 59, 62
United Kingdom, 17
United Nations, 20, 81
United Nations Development Programme (UNDP), 25
United States, 15–17, 49, 76
Universal Declaration of Human Rights (1948), 20
urban areas, 25, 78

V

Venezuela, 63–65
Viet Nam, 31
vitamin A, 71–73, 76
HIV and, 19, 73, 75
in resistance to malaria, 74–75
measurement of, 81
vitamin A deficiency, 10–14, 46, 58–59, 72–73, 76
HIV and, 19, 73, 75
improving diet for, 60–61
in Indonesia, 61–63
vitamin A supplements, 12–13, 29, 58–60, 62–63, 67, 76
child deaths reduced by, 59–60, 72
during crises, 80
food fortified with, 64
maternal deaths reduced by, 12–13
vitamin B, 83
vitamin D, 14
vitamin D deficiency, 10, 14
vitamin and mineral deficiencies, 13, 14

W

water, 25, 26, 65
weight
gained by pregnant women, 22, 31
in assessment of malnutrition, 14
in Tanzanian child nutrition programme, 41
severe underweight in children, 15
whipworms, 84
Wildman, Bob, 56–57
women
anaemia among, 10, 11, 61, 78
care and, 27–28
discrimination against, 11, 29, 39
empowerment of, 37
household food security and, 25
in Niger, 46–47
in Tanzanian child nutrition programme, 43
malnutrition and, 17
nutrition and status of, 39
pregnancy-related deaths of, 12, 75–76
right to nutrition of, 21
stunting among, 15
see also pregnant women
work, during pregnancy, 31
World Alliance for Breastfeeding Action (WABA), 49
World Bank, 35
World Declaration and Plan of Action on the Survival, Protection and Development of Children (1990), 20
World Health Assembly, 48
World Health Organization, 11, 15, 48, 51, 54, 63, 66, 71, 75, 79
World Summit for Children (1990), 14, 20, 21, 51, 53
World Vision of South Africa, 86
worms, intestinal, 83–85

Y

Yajnik, Ranjan, 78

Z

Zidovudine (drug), 73
Zimbabwe, 39
zinc, 72–75, 77
zinc deficiency, 72, 76, 77

Glossary

ACC/SCN
Administrative Committee on Coordination/ Subcommittee on Nutrition

AIDS
acquired immune deficiency syndrome

ALIM
Latin American Millers Association

ARI
acute respiratory infections

BFHI
Baby-Friendly Hospital Initiative

BRAC
Bangladesh Rural Advancement Committee

CSD
Child Survival and Development Programme (Tanzania)

ECLAC
Economic Commission for Latin America and the Caribbean

FAO
Food and Agriculture Organization of the United Nations

GDP
gross domestic product

GMP
growth monitoring and promotion

GNP
gross national product

HANDS
Health and Nutrition District Support (Tanzania)

HIV
human immunodeficiency virus

ICCIDD
International Council for the Control of Iodine Deficiency Disorders

IDD
iodine deficiency disorders

IFAD
International Fund for Agricultural Development

IMF
International Monetary Fund

INCAP
Institute of Nutrition of Central America and Panama

IQ
intelligence quotient

MCR
Medical Research Council (UK)

MI
Micronutrient Initiative (Canada)

NCHS
National Center for Health Statistics

NGO
non-governmental organization

ODA
official development assistance

ORS
oral rehydration salts

ORT
oral rehydration therapy

PEM
protein-energy malnutrition

U5MR
under-five mortality rate

UN
United Nations

UNAIDS
Joint United Nations Programme on HIV/AIDS

UNDP
United Nations Development Programme

UNHCR
Office of the United Nations High Commissioner for Refugees

UNICEF
United Nations Children's Fund

USAID
United States Agency for International Development

WABA
World Alliance for Breastfeeding Action

WFP
World Food Programme

WHO
World Health Organization

Note: All dollars are US dollars

unicef

UNICEF Headquarters
3 UN Plaza
New York, NY 10017, USA

UNICEF Regional Office for Europe
Palais des Nations
CH-1211 Geneva 10, Switzerland

UNICEF Regional Office for Central and Eastern Europe, Commonwealth of Independent States, and Baltic States
Palais des Nations
CH-1211 Geneva 10, Switzerland

UNICEF Regional Office for Eastern and Southern Africa
P.O. Box 44145
Nairobi, Kenya

UNICEF Regional Office for West and Central Africa
P.O. Box 443
Abidjan 04, Côte d'Ivoire

UNICEF Regional Office for the Americas and the Caribbean
Apartado 7555
Santa Fe de Bogotá, Colombia

UNICEF Regional Office for East Asia and the Pacific
P.O. Box 2-154
Bangkok 10200, Thailand

UNICEF Regional Office for the Middle East and North Africa
P.O. Box 811721
11181 Amman, Jordan

UNICEF Regional Office for South Asia
P.O. Box 5815
Lekhnath Marg
Kathmandu, Nepal

UNICEF Office for Japan
UN Headquarters Building
8th floor
53-70, Jingumae 5-chome
Shibuya-ku
Tokyo 150, Japan

Malnutrition is largely a silent and invisible emergency, exacting a terrible toll on children and their families. The result of multiple causes, including a lack of food, common and preventable infections, inadequate care and unsafe water, it plays a role in more than half of the nearly 12 million deaths each year of children under five in developing countries, a proportion unmatched since the Black Death ravaged Europe in the 14th century. Malnutrition blunts intellects and saps the productivity and potential of entire societies. Poverty, one of the causes of malnutrition, is also a consequence, a tragic bequest by malnourished parents to the next generation.

The State of the World's Children 1998 report details the scale of the loss and the steps being taken to stem it. Sentinels of progress are lighting the way. Nearly 60 per cent of the world's salt is now iodized, and millions of children every year are spared mental retardation as a result. Vitamin A supplementation is helping bolster disease resistance in children and may soon become an important measure in helping reduce maternal deaths around the world. Communities are working together to identify their problems, decide on their options and take action, with women emerging to play leadership roles that spark numerous other changes in people's lives.

Children have the right, recognized in international law, to good nutrition. The world has the obligation to protect that right, building on both the great experience gained and the scientific knowledge achieved. Action is both possible and imperative.

OXFORD UNIVERSITY PRESS
£6.95 net in UK $12.95 in USA
ISBN 0-19-829401-8

BEST COPY AVAILABLE